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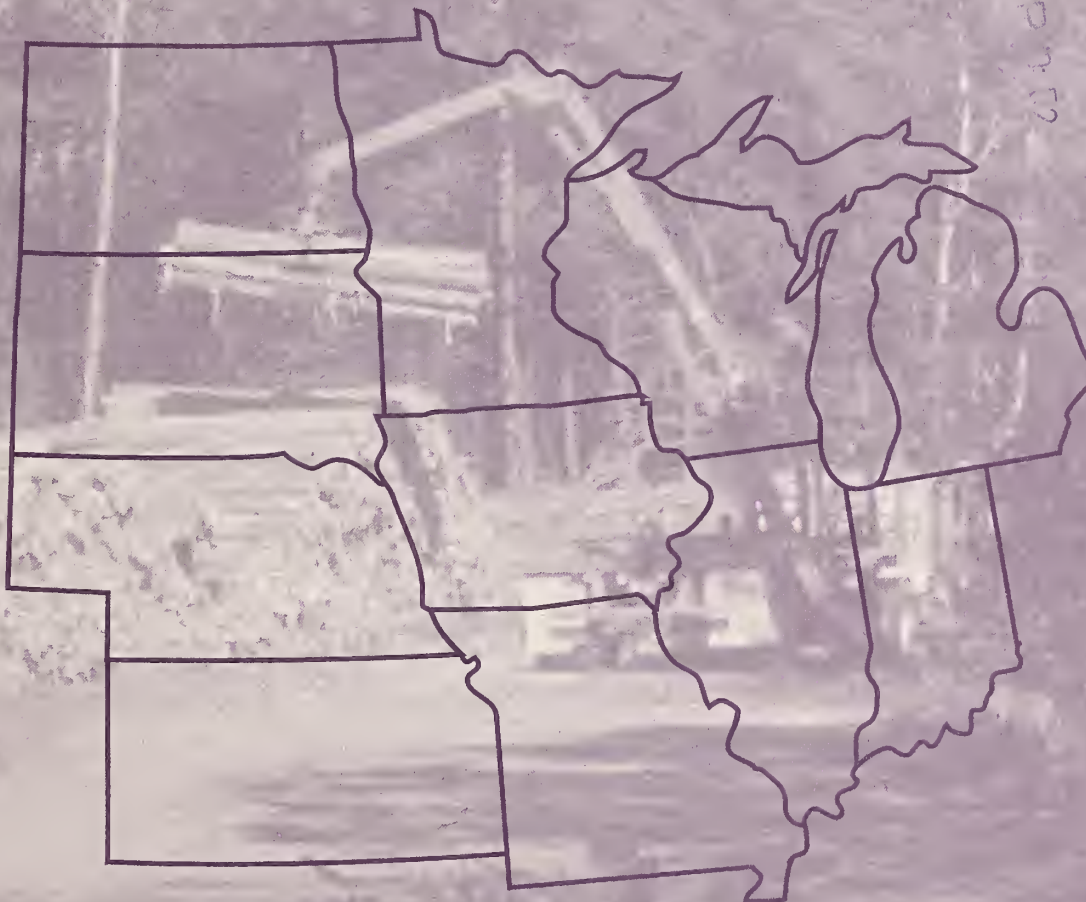
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Pulpwood Production in the North-Central Region, 1998

Ronald J. Piva



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Pulpwood Production in the North-Central Region, 1998

Ronald J. Piva

NOTE: Data from new pulpwood production surveys are often compared with data from earlier surveys to determine trends in forest resources utilization. However, for the comparisons to be valid, the procedures used in the two surveys must be similar. In addition, when new surveys are completed, errors and omissions from previous surveys are corrected. As a result of our ongoing efforts to improve the survey's efficiency and reliability, changes may have been made to the previous survey's data. All comparisons and analysis in this report are based on the reprocessed data from earlier surveys. Because changes may make it inappropriate to directly compare the current data with earlier published data, comparison between surveys should be general and used solely for analyzing trends.

This report includes all primary products made from reconstituted wood fiber. In addition to wood pulp, this includes particleboard and engineered lumber products made from chips, shavings, wafers, flakes, strands, and sawdust. This report presents the production by county of the raw fiber material delivered to mills. Thus, these data report only that portion of the timber harvest used as raw material and do not necessarily reflect the volume of growing stock harvested.

Pulpwood constitutes more than half the industrial timber products harvested annually in the Lake States (Michigan, Minnesota, and Wisconsin) and is an important product in the Central States (Illinois, Indiana, Iowa, and Missouri) and the Plains States (Kansas, Nebraska, North Dakota, and South Dakota).

Current detailed information about pulpwood production¹ is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, forest industry development, and scientific studies.

Since 1979, we have included logs, bolts, and wood residue used in manufacturing flakeboard, waferboard, oriented strandboard, and medium

density fiberboard in this annual report. Engineered lumber was included in this report in 1992. Together, these products are called particleboard, and all mills manufacturing these boards are called particleboard mills in this report. Wood used at particleboard mills is identical or nearly identical to wood used at pulp mills; therefore, including this wood in our study provides a more accurate estimate of demand for pulpwood-like material.

Particleboard mills were in their infancy before 1979 and used primarily aspen and wood residue. Therefore, data for these mills do not distort roundwood use trends for other species or preclude comparing 1998 survey results with those of 1978 and previous years.

Pulp and particleboard mills using timber from the North Central States in 1998 reported their pulpwood receipts² by species group and county

¹ Pulpwood production, determined from mill receipts, is the annual volume of pulpwood cut, plus the annual wood residue volume produced by sawmills, veneer mills, etc. used for pulp, particleboard, waferboard, oriented strandboard, medium density fiberboard, or engineered lumber.

² Pulpwood receipts are the volumes of wood received by mills in a specific State or region, regardless of the geographic source.

About the Author:

Ronald J. Piva, Forester, received a B.S. degree in forest management from the University of Missouri-Columbia. He joined the Forest Service in 1987 and has been working with the North Central Station's Forest Inventory and Analysis unit since.

of origin. This report presents the results of the survey, analyzes the data, compares results with those of 1997 and earlier years, and discusses trends in pulpwood production and use.

The Lake States, Central States, and Plains States are discussed separately because the timber types in each area are different, the flow of wood between the areas is nominal, and more detailed data on pulpwood production and receipts in the Central and Plains States might reveal the operations of

individual mills. This is the 40th annual report of the pulpwood harvest in Lake States counties, the 37th annual report of the Central States harvest, and the 6th report of the pulpwood harvest in the Plains States.

Several mills purchase their pulpwood based on weight rather than volume. Factors used to convert green tons of pulpwood to standard cord equivalents are shown in the appendix.

LAKE STATES

PRODUCTION

- Pulpwood production as a whole decreased less than one-half percent from 1997 to 1998, to 9.2 million cords³. Of each cord produced, 89 percent came from roundwood (including chips from roundwood) and 11 percent came from the residue⁴ of wood-using plants (fig. 1).
- Hardwoods constituted 71 percent of the total pulpwood production.
- Principal species of roundwood harvested in 1998 were aspen (3.9 million cords), soft maple (639 thousand cords), hard maple (598 thousand cords), jack pine (558 thousand cords), and white birch (437 thousand cords) (table 1).
- Aspen remained the dominant species of pulpwood roundwood harvested—47 percent of the total.
- Softwood roundwood production decreased by 187 thousand cords, or almost 10 percent, from 1997 to 1998. Pulpwood production from softwood residues rose by 199 thousand cords, an increase of over 100 percent from the previous year (fig. 2).

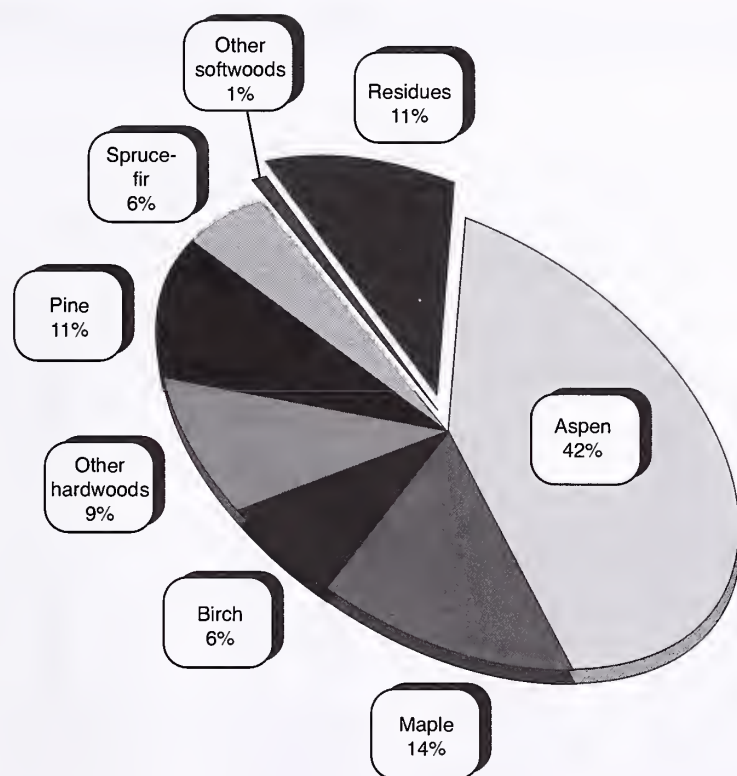
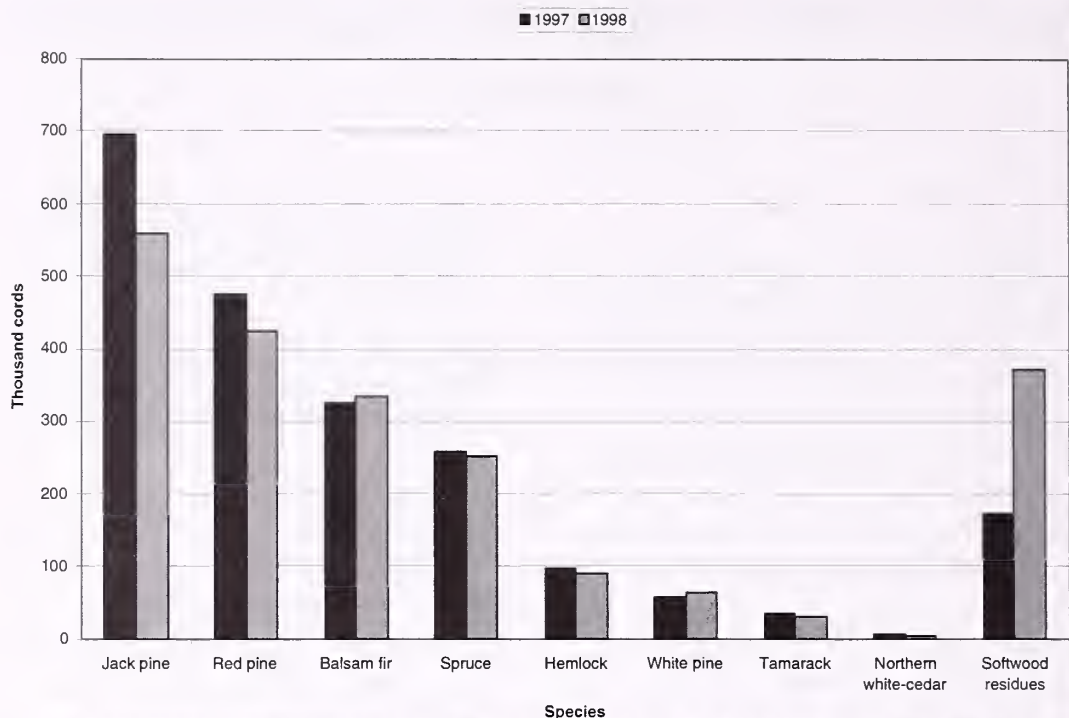


Figure 1.—Lake States pulpwood production by species group and residues, 1998.

³ All references to cords are in standard cords. A standard cord is 128 cubic feet of wood, bark, and air space.

⁴ Residue is the byproduct from sawmills, veneer mills, cooperage mills, and other wood-using mills that is used for pulping and particleboard. Residue includes slabs, edgings, veneer cores, sawdust, fines, woodflour, and chips manufactured from slabs, edgings, and veneer cores.

Figure 2.—Softwood pulpwood production in the Lake States, 1997-1998.



- Hardwood roundwood production decreased by 5 percent, from 6,778 thousand cords in 1997 to 6,464 thousand cords in 1998. Pulpwood production from hardwood residue rose by 8 percent during the same period (fig. 3).
- Whole-tree chip⁵ (WTC) production made up 7 percent of the total pulpwood production or 679 thousand cords in the Lake States in 1998, a 7-percent decrease from the previous year. Compared to 1997 production levels, hardwood WTC production in 1998 decreased by 6 percent and softwood WTC production decreased by 11 percent (fig. 4).
- Michigan was the major producer of WTC in the Lake States in 1998 with 456 thousand cords (67 percent of the WTC production) (fig. 5).
- Aspen was the predominant species used in WTC in 1998 with 251 thousand cords or 37 percent of the total WTC production.
- Jack pine was the predominant softwood species used in WTC in 1998, making up 87 percent of the softwood WTC production and 12 percent of the total WTC production.

Michigan

- Michigan pulpwood production rose by 10 thousand cords to 3.1 million cords in 1998, an increase of less than one-half percent over 1997 (fig. 6 and table 2).
- In 1998, hardwoods accounted for 78 percent of Michigan's pulpwood production.
- Roundwood production for pulpwood decreased by 5 percent from 1997 to 1998, to 2.7 million cords (fig. 7 and table 3).
- The Western Upper Peninsula was the top-producing region in the State in 1998 with 42 percent of the roundwood harvested (table 4).

⁵ Pulpwood produced from chipping entire trees (all portions of the trees above ground, except the stumps).

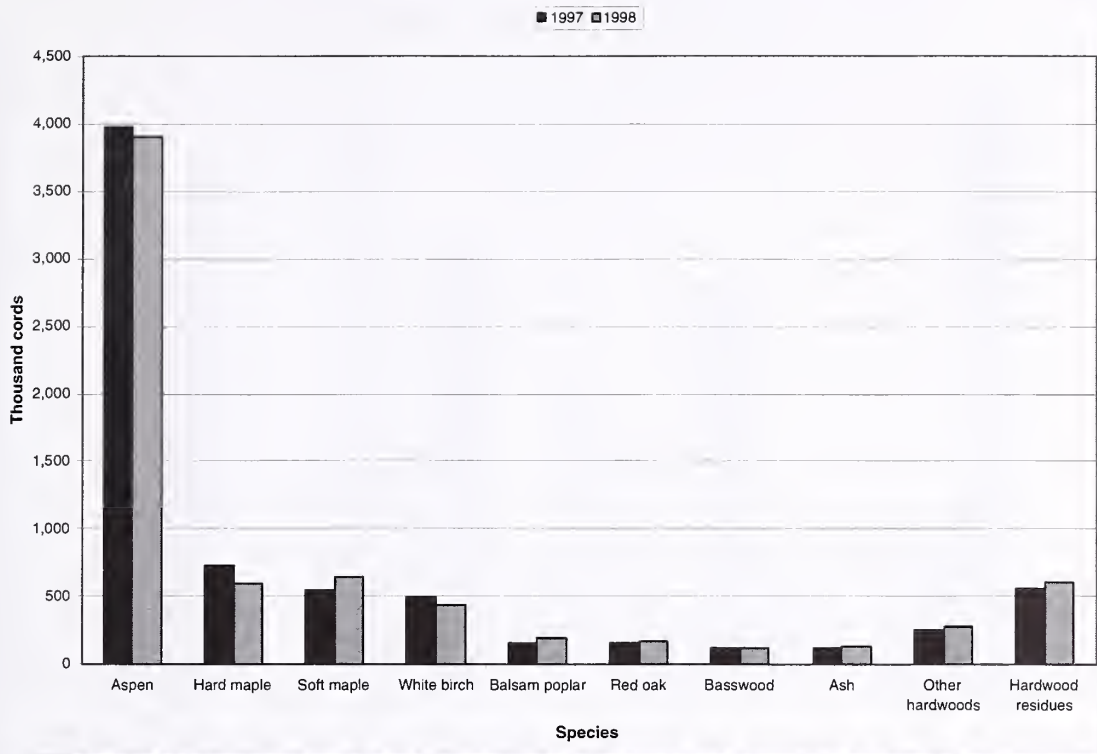


Figure 3.—*Hardwood pulpwood production in the Lake States, 1997-1998.*

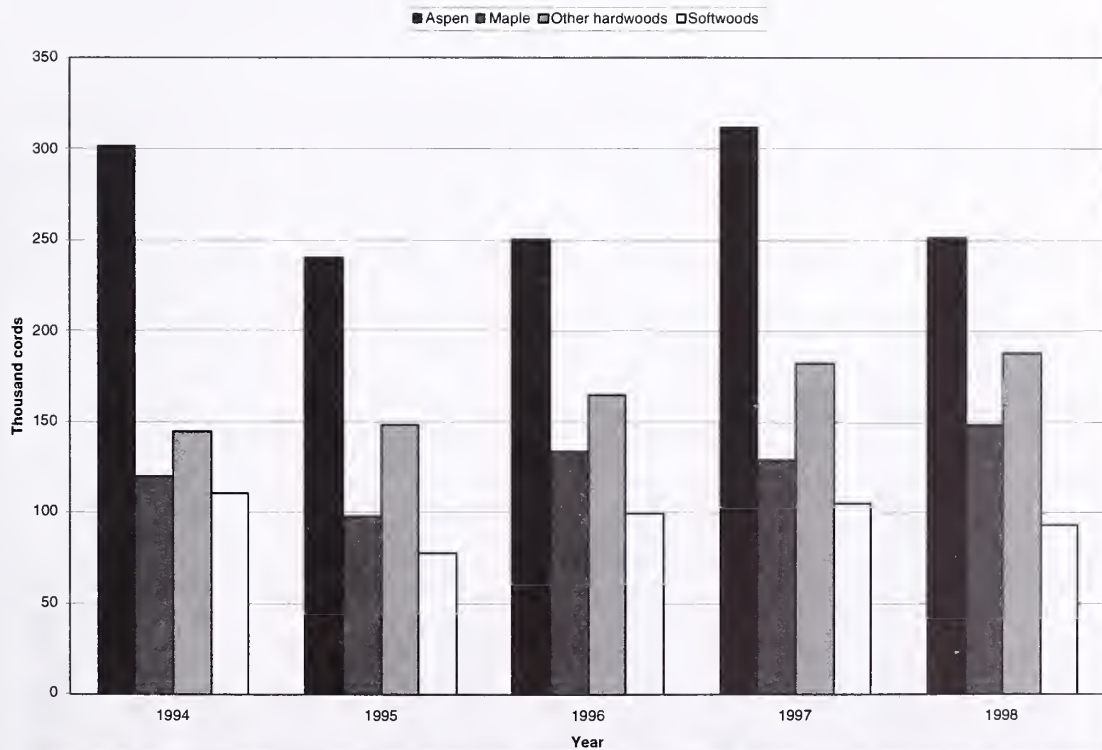


Figure 4.—*Whole-tree chip production in the Lake States, 1994-1998.*

Figure 5.—*Whole-tree chip production by State in the Lake States, 1998.*

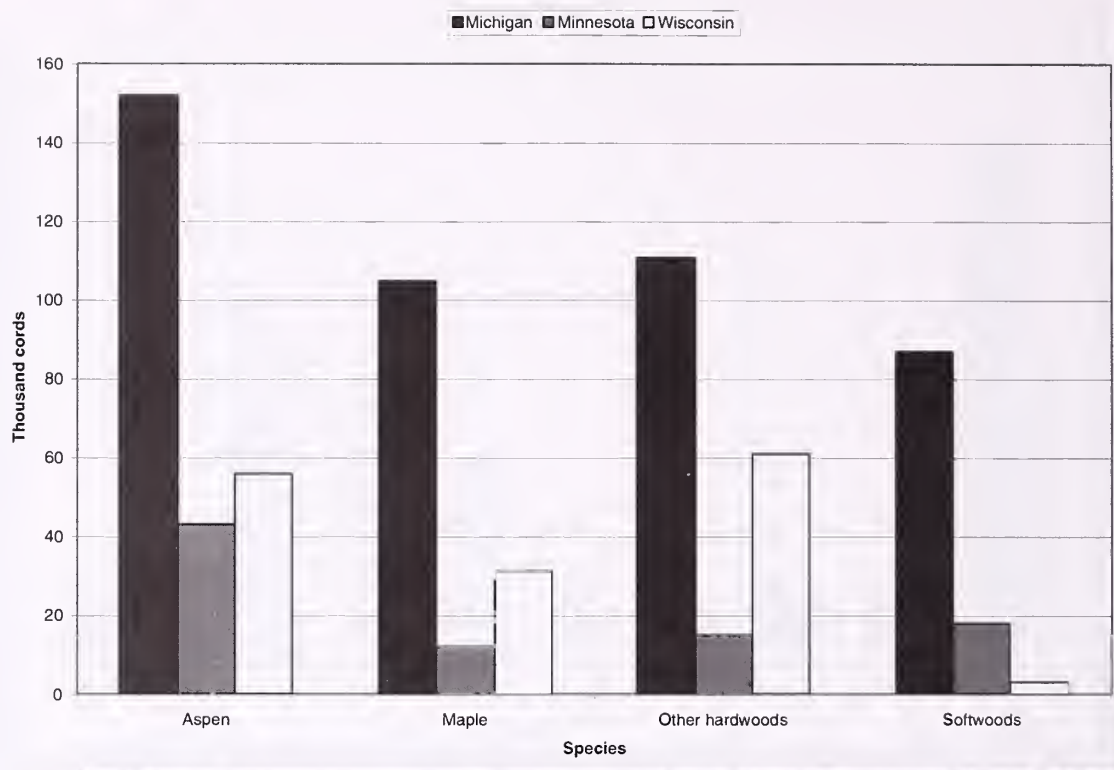
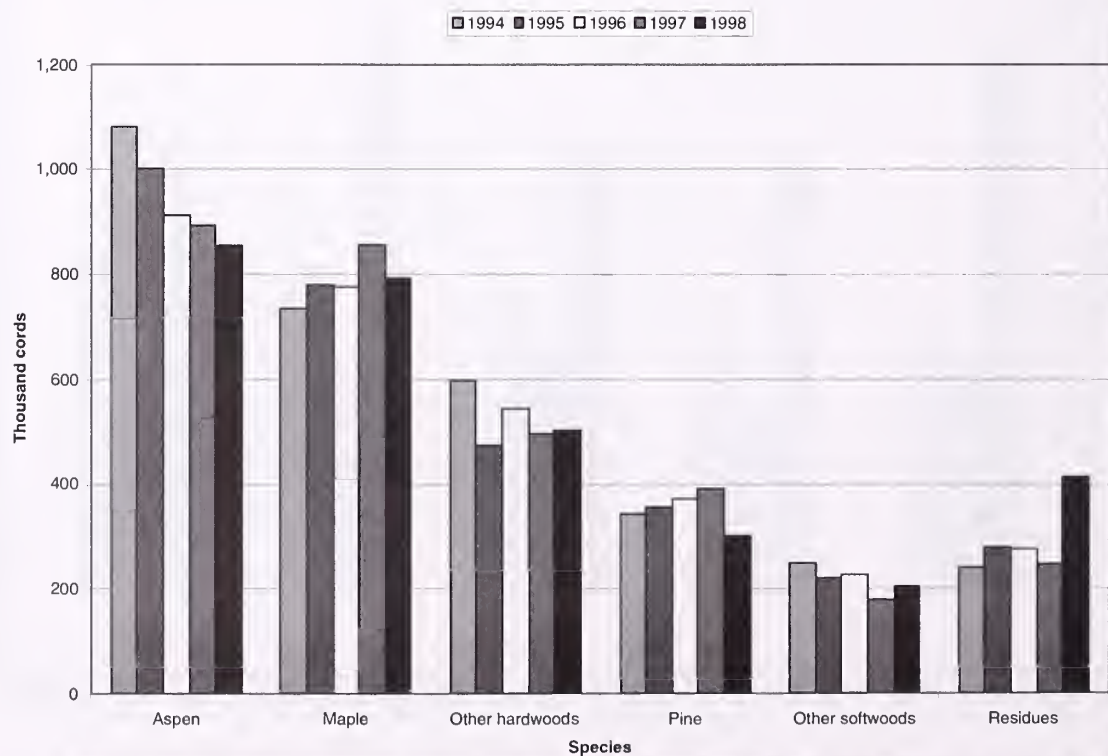


Figure 6.—*Michigan pulpwood production by species group and residues, 1994-1998.*



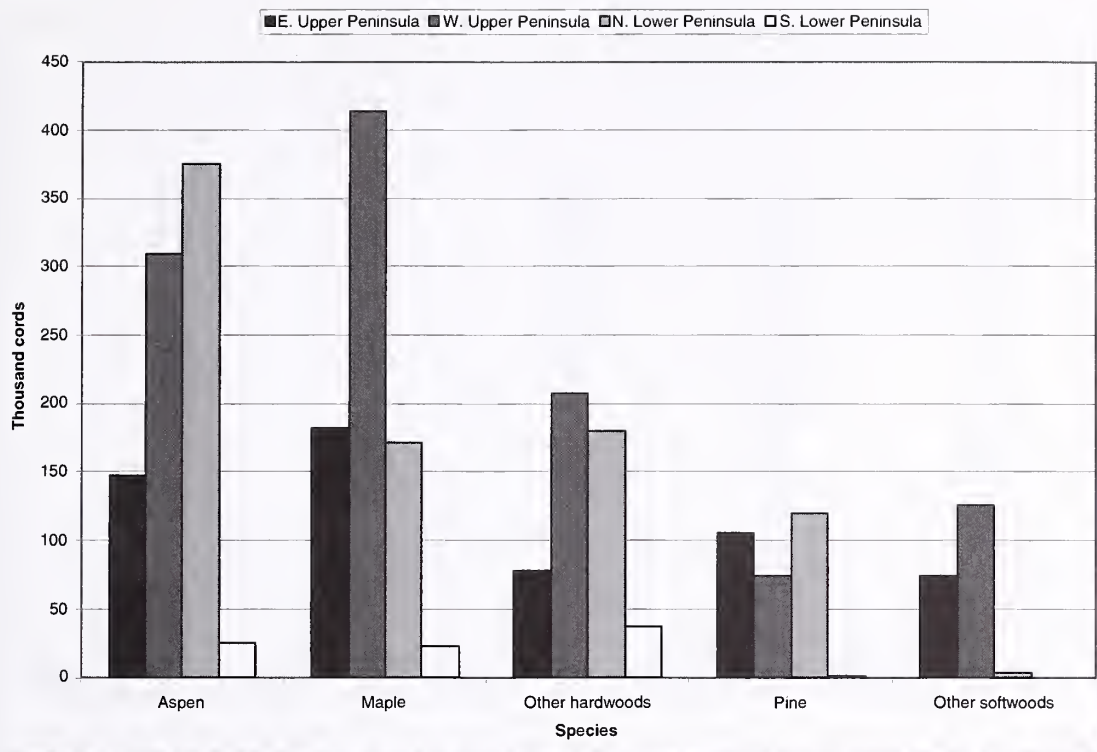


Figure 7.—Michigan roundwood pulpwood production by Forest Survey Unit and species groups, 1998.

- Marquette County in the Western Upper Peninsula was the top producer of roundwood in the State with 243 thousand cords (table 5).
- From 1997 to 1998, roundwood pulpwood production increased by nearly 35 percent in the Southern Lower Peninsula, decreased by 5 percent in the Western Upper Peninsula, decreased by 7 percent in the Eastern Upper Peninsula, and decreased by 8 percent in the Northern Lower Peninsula.
- The production of pulpwood from residues increased by 68 percent from 1997 to 1998, rising from 247 thousand cords in 1997 to 414 thousand cords in 1998.
- Ninety-four percent of the pulpwood produced came from roundwood.
- The Northern Pine and the Aspen-Birch Units were the top pulpwood-producing roundwood regions in the State in 1998 with 1.4 million cords and 1.1 million cords, respectively (fig. 9).
- St. Louis County, in the Aspen-Birch Unit, remained the top roundwood-producing county with 555 thousand cords, followed by Itasca County, in the Northern Pine Unit, with 382 thousand cords (table 6).
- Aspen pulpwood production fell by 38 thousand cords between 1997 and 1998. Aspen accounted for 74 percent of all the roundwood harvested for pulpwood.

Minnesota

- Pulpwood production decreased by less than 5 thousand cords from 1997 to 3.0 million cords in 1998 (fig. 8).
- Hardwoods accounted for over 80 percent of the total pulpwood produced in 1998.
- From 1997 to 1998, pulpwood production from softwood residues increased by 147 percent and hardwood residue use increased by 23 percent. Overall, the use of mill residues for pulpwood production increased by 68 percent.

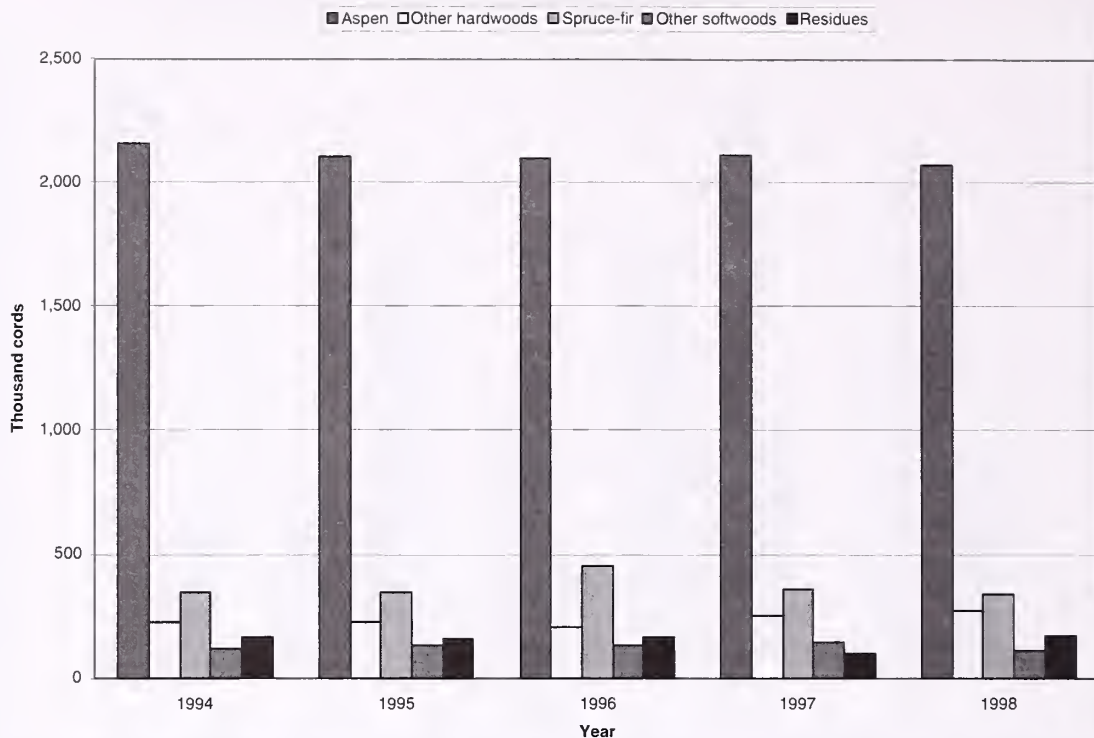


Figure 8.—Minnesota pulpwood production by species group and residues, 1994-1998.

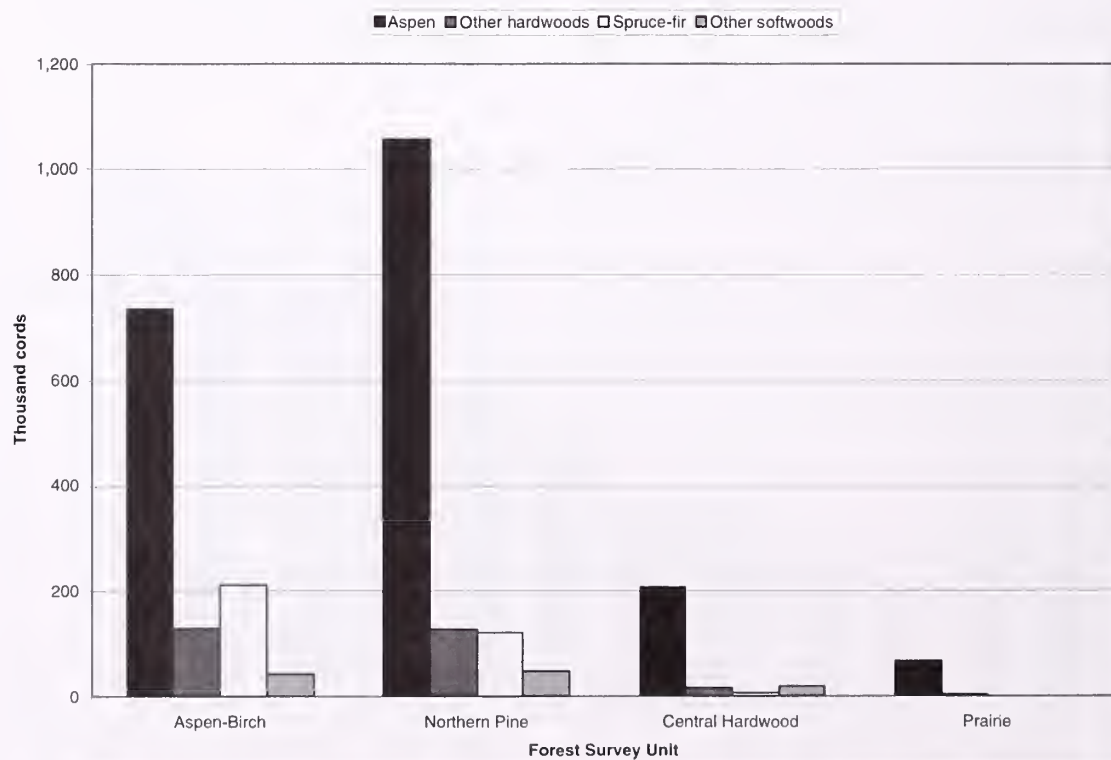


Figure 9.—Minnesota roundwood pulpwood production by Forest Survey Unit and species group, 1998.

Wisconsin

- Pulpwood production in Wisconsin decreased by 1 percent from 1997 to 1998, to 3.2 million cords (fig. 10).
- Hardwoods accounted for over 70 percent of the total pulpwood production in 1998.
- Roundwood harvested for pulpwood accounted for 87 percent of the pulpwood produced in 1998.
- The Northwestern Forest Survey Unit remained the top producer of roundwood for pulping in the State with 1.1 million cords (fig. 11).
- Sawyer County replaced Douglas County as the top pulpwood-producing county in the State with 173 thousand cords (table 7).

- Between 1997 and 1998, aspen harvests decreased by 5 thousand cords to 975 thousand cords.
- In 1998, the use of softwood residues for pulpwood increased by 13 percent from the previous year, while the use of hardwood residues remained relatively constant.

Harvesting Intensity

- In the following figures, the distribution of the harvest is shown in two ways: first, the amount of pulpwood cut relative to the growing-stock volume in each of five major pulpwood species (fig. 12), and second, the amount of pulpwood relative to commercial timberland area (fig. 13).

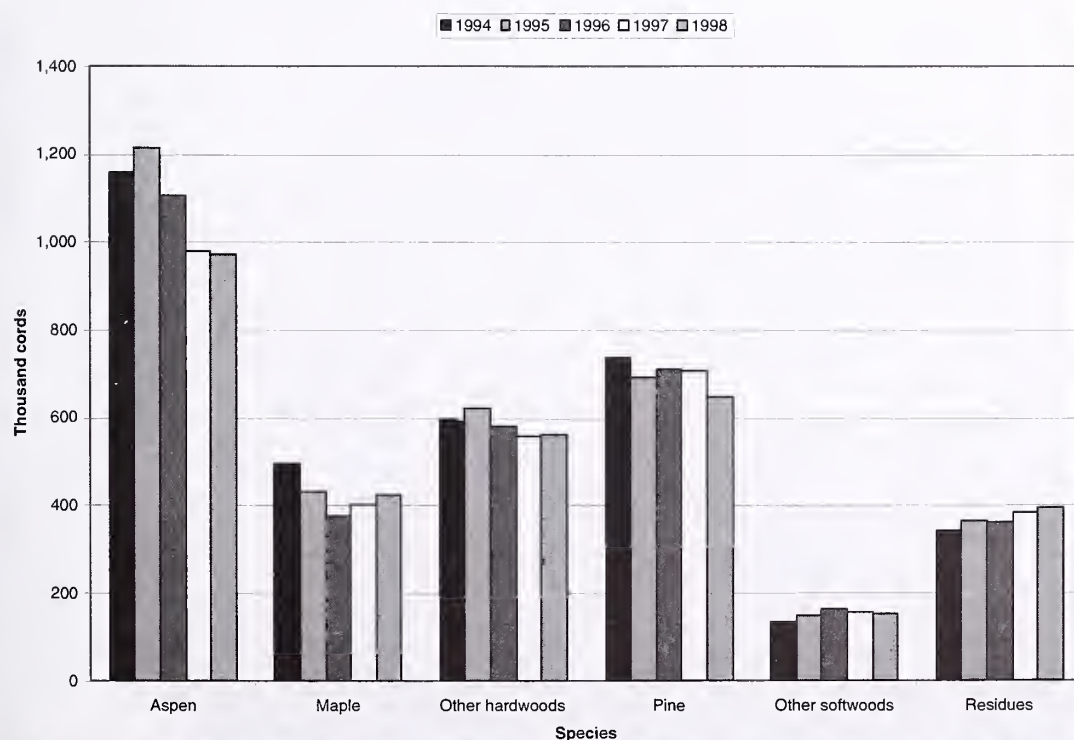


Figure 10.—Wisconsin pulpwood production by species group and residues, 1994-1998.

Figure 11.—*Wisconsin roundwood pulpwood production by Forest Survey Unit and species group, 1998.*

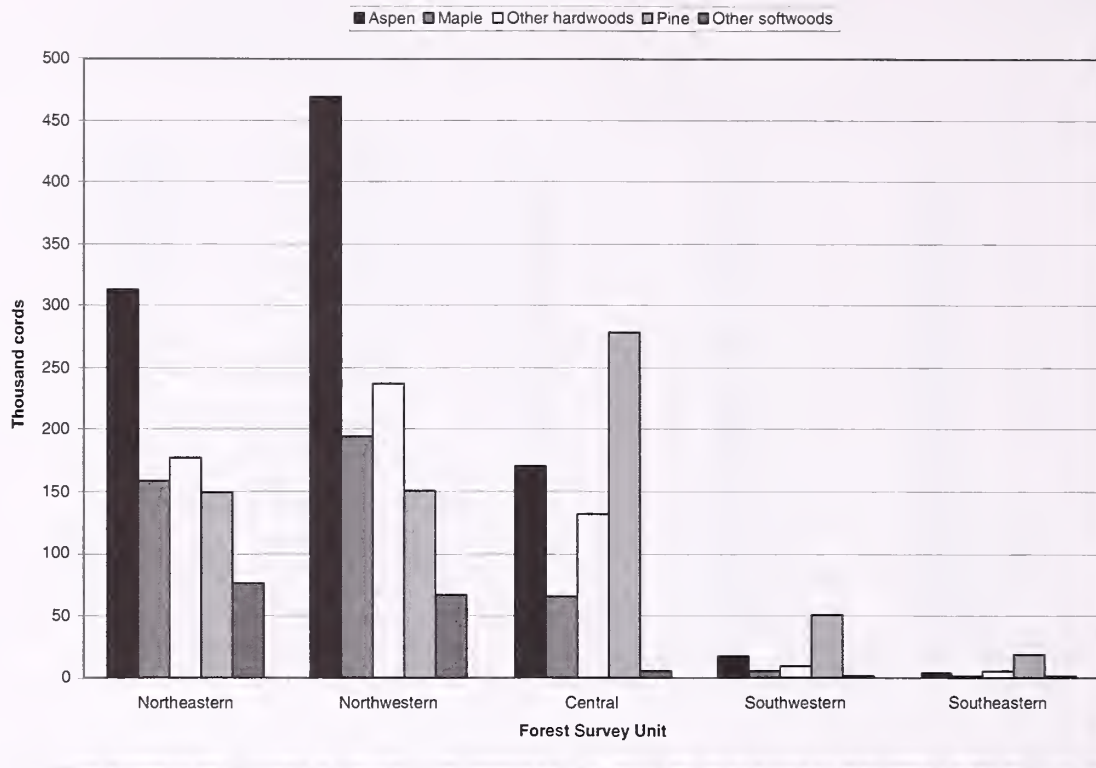
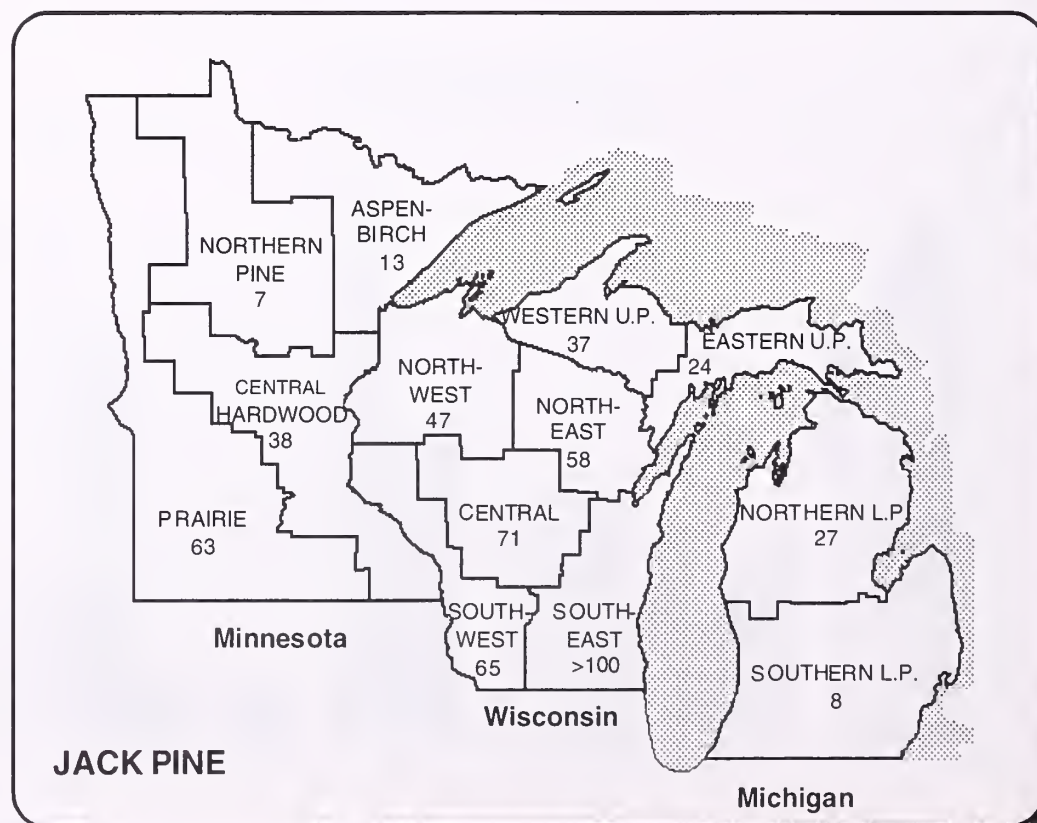
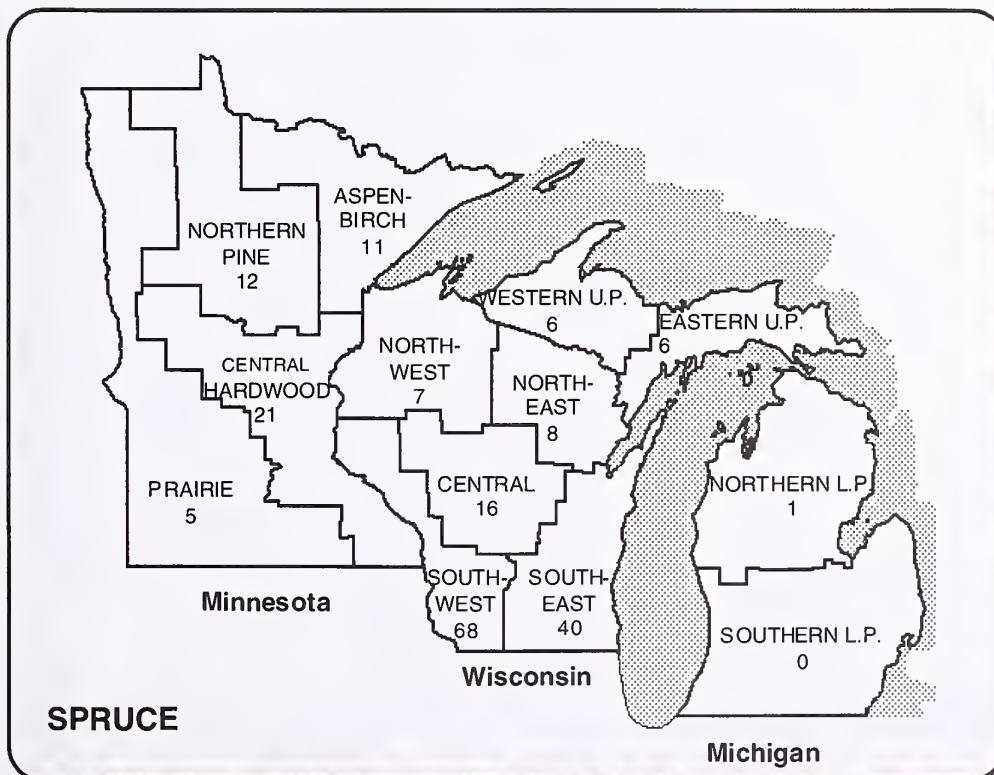
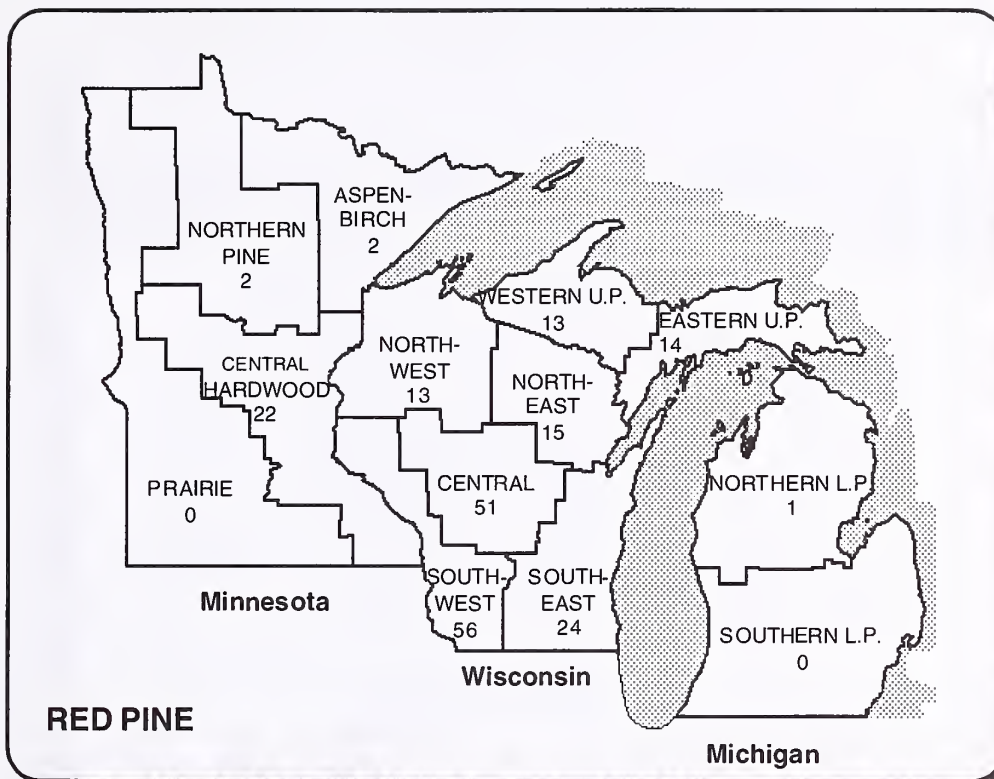
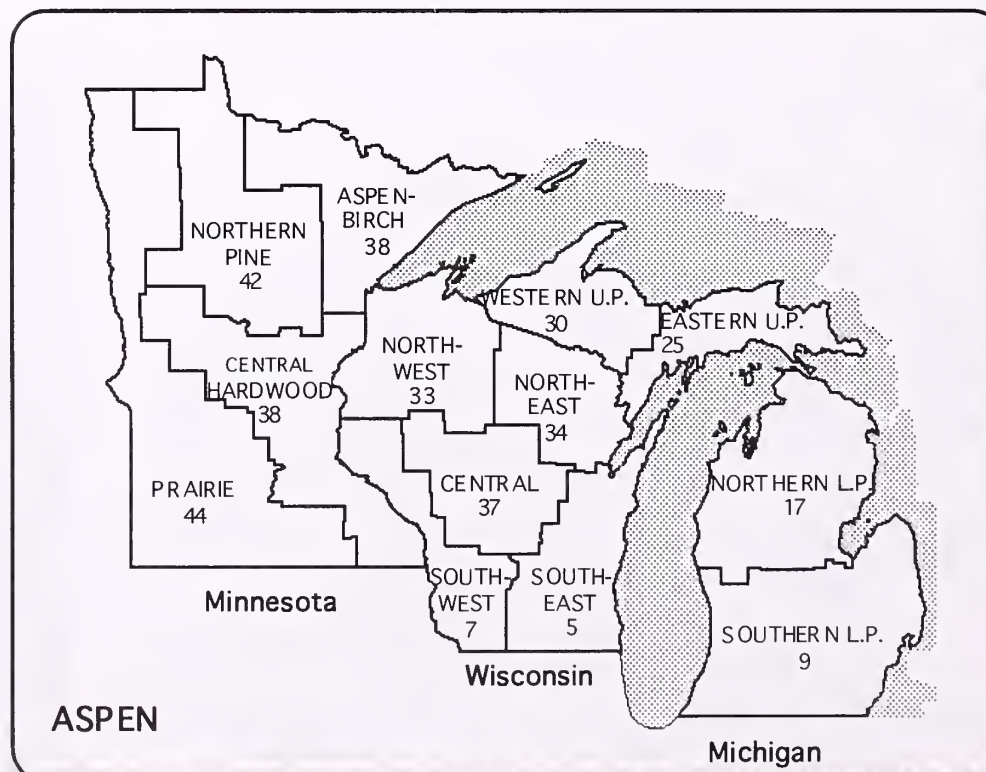
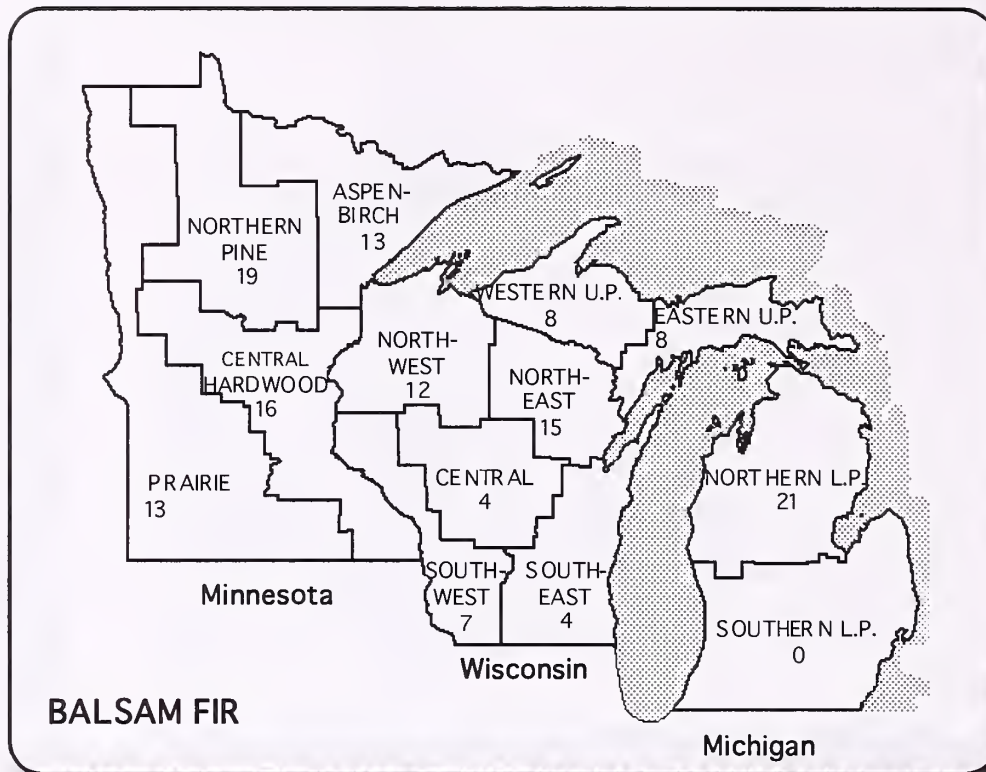


Figure 12.—*Cords of roundwood pulpwood (including chips from roundwood) harvested per 1,000 cords of growing-stock volume for each of five principal pulpwood species by Forest Survey Unit, 1997. Growing-stock volume was determined during the last forest inventory for each State.*







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Pulpwood harvesting was most intensive (100,000 cords or more) in the following Forest Survey Units by species:

Species	State	Forest Survey Unit
Balsam fir	Minnesota	Aspen-Birch
Jack pine	Michigan Wisconsin	N. Lower Peninsula Central
Red pine	Wisconsin	Central
Spruce	Minnesota	Aspen-Birch
Aspen	Michigan Minnesota Wisconsin	N. Lower Peninsula, W. Upper Peninsula, E. Upper Peninsula Northern Pine, Aspen-Birch, Central Hardwood Northwestern, Northeastern, Central
White birch	Wisconsin	Northwestern
Hard maple	Michigan	W. Upper Peninsula
Soft maple	Michigan	W. Upper Peninsula, N. Lower Peninsula

RECEIPTS

- In 1998, 35 woodpulp and 14 particleboard mills in the Lake States acquired 9.5 million cords of pulpwood, just 10 thousand cords higher than 1997 total receipts.
- Aspen roundwood was processed at 40 of the 49 pulp and particleboard plants in the Lake States in 1998 (fig. 14 and table 8).
- In 1998, Wisconsin supplied wood to 33 mills, Michigan supplied 31 mills, and Minnesota supplied 27 mills.
- Total imports of all wood material in 1998 were 334 thousand cords, an 18-percent increase from 1997. Canada contributed 65 percent of the total import receipts.
- Total imports of roundwood increased by 26 percent, from 266 thousand cords in 1997 to 334 thousand cords in 1998. Softwood roundwood, mainly spruce and jack pine, made up more than 70 percent of the increased volume of roundwood imported into the Lake States.

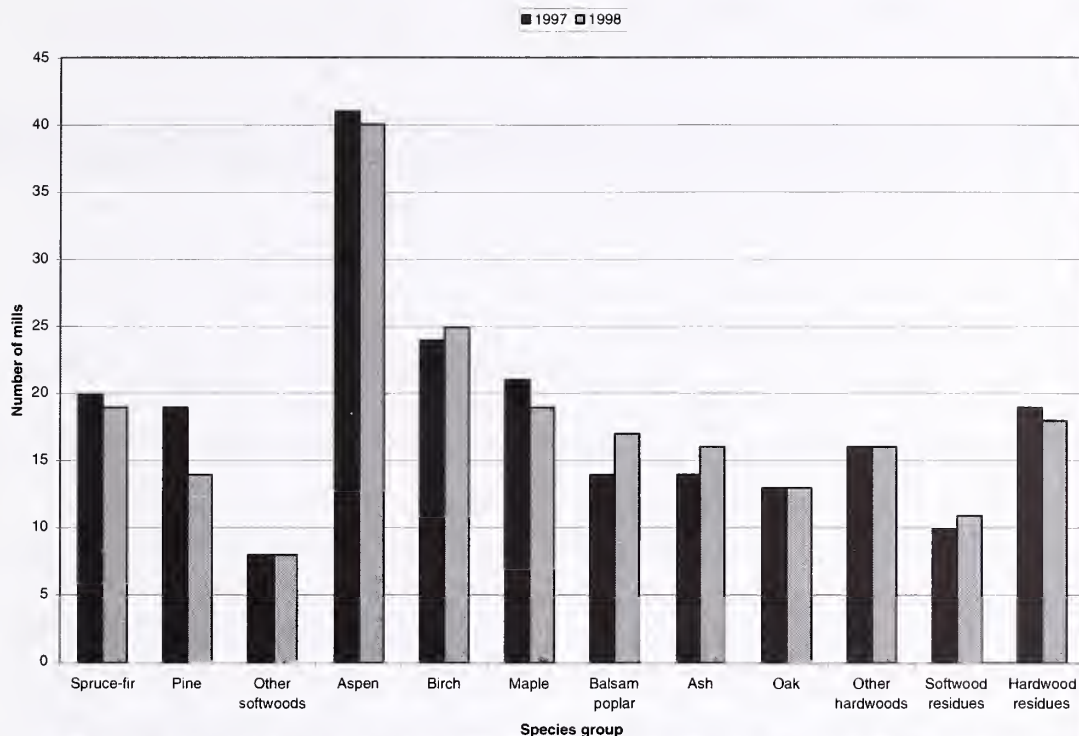


Figure 14.—Numbers of industrial plants in the Lake States using a particular species or residue for pulping and particleboard 1997-1998.

- Canada supplied 97 percent of the total roundwood volume imported.
- Imports of residues increased by 5 percent in 1998. Residues from the Plains States and other Western States made up two-thirds of the total residues imported by mills in the Lake States.

Michigan

- The eight Michigan pulp mills, three OSB mills, and one particleboard mill consumed 3.0 million cords in 1998, down 2 percent from the previous year. Nine percent of the total consumption was imported from out of State, with Wisconsin supplying three-fourths of the imports.

Minnesota

- The 10 pulp mills, 5 OSB mills, and 1 laminated structural lumber mill in Minnesota reported consuming an estimated 2.8 million cords in 1998, an increase of almost 2 percent from 1997. Six percent of Minnesota's consumption for pulpwood came from out-of-State sources. Canada furnished two-thirds of the imported wood material.

Wisconsin

- The 17 pulp mills, 2 OSB mills, and 2 particleboard mills in Wisconsin consumed 3.6 million cords in 1998, up 1 percent from 1997. Nineteen percent of the total receipts were imported from out of State. Imports from Michigan and Minnesota accounted for 40 percent and 37 percent of the total imports, respectively.

INDUSTRY TRENDS AND ANALYSIS

Pulp Mills

For this section pulp mill products include wood fiber products such as paper, paperboard, hardboard, insulation board, and medium-density fiberboard. All of these products are manufactured from wood that has been reduced to individual fibers, small fiber bundles, or fiber parts that are subsequently formed into a mat. Wood material from the Lake States sent to mills in other States and Canada is included.

- Of the 9.5 million cords of pulpwood processed in 1998, 6.6 million cords (70 percent) were used for woodpulp products. Of each cord used to produce pulp, 86 percent came from roundwood and 14 percent came from mill residues.
- Principal species harvested for pulp were aspen (1,866 thousand cords), hard maple (571 thousand cords), soft maple (536 thousand cords), jack pine (463 thousand cords), and red pine (415 thousand cords) (fig. 15).
- Hardwoods were still the mainstays of the pulp mills in the region in 1998 with hard-wood roundwood contributing 61 percent of total production and hardwood residues supplying another 8 percent.
- The use of softwood roundwood by the pulp mills in the Lake States decreased by 7 percent from 1997 to 1998. Softwood residue use, on the other hand, increased by 58 percent from the previous year.
- Average daily woodpulp production was 15.0 thousand tons per day in 1998, down from 15.1 thousand tons per day in 1997 (table 9).

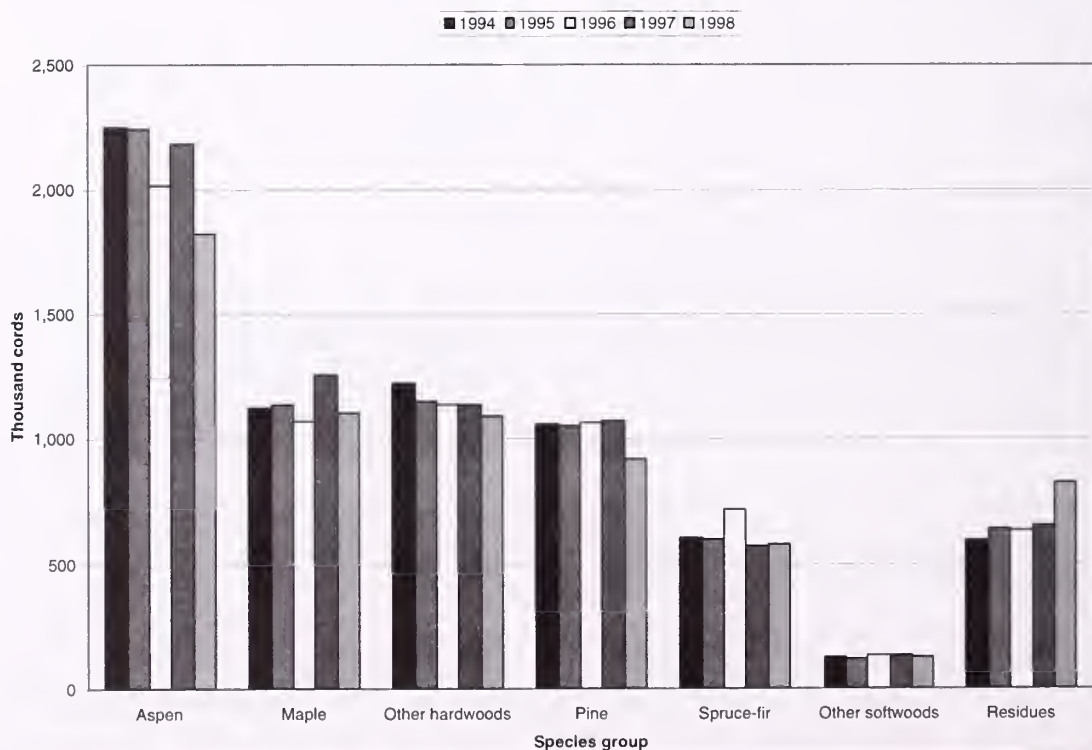


Figure 15.—Pulpwood production in the Lake States for pulp by species group and residues, 1994-1998.

- Lake States pulpwood production for pulp mills during the period 1994-1998 was:

Product form and species group	Production				
	1994	1995	1996	1997	1998
(Thousand cords)					
Roundwood					
Softwoods	1,790	1,776	1,920	1,788	1,627
Aspen	2,253	2,241	2,018	2,036	1,825
Other hardwoods	2,351	2,291	2,209	2,268	2,198
Residue	594	642	630	649	812
Total	6,989	6,949	6,778	6,741	6,463

Michigan

- Pulpwood production for wood pulp was 2.1 million cords in 1998, a 6-percent decrease from 1997.
- Hard and soft maple replaced aspen as the major pulpwood species harvested in the State with 346 thousand cords and 345 thousand cords, respectively. Other major species were aspen with 320 thousand cords and jack pine with 105 thousand cords.
- Michigan mills imported 175 thousand cords of pulpwood for processing (158 thousand cords from Wisconsin, 15 thousand cords from Indiana, and 2 thousand cords from Canada). Michigan exported 269 thousand cords to Minnesota, Wisconsin, and Canada. Over three-fourths of the wood imported was in the form of roundwood, and 70 percent of the exports were roundwood.
- Michigan mills used 1,674 thousand cords of hardwood material in 1998, a decrease of 10 percent from 1997. The use of softwood material decreased by 1 percent to 358 thousand cords during the same period.
- Aspen was the predominant species harvested in the State with 931 thousand cords, 6 percent less than the previous year. Other major species were balsam fir with 184 thousand cords and spruce with 155 thousand cords.
- Mills in Minnesota imported 130 thousand cords for pulp products (84 thousand cords from Canada, 45 thousand cords from Wisconsin, and 1 thousand cords from Michigan). Minnesota exported 159 thousand cords to Wisconsin and 39 thousand cords to Canada. Roundwood made up 50 percent of the imports and 76 percent of the exports.
- Minnesota mills had a 3-percent decrease in the use of hardwood material, from 1,209 thousand cords in 1997 to 1,174 thousand cords in 1998. The use of softwood material increased by 12 percent to 450 thousand cords in 1998.

Wisconsin

- Pulpwood production for woodpulp products in 1998 fell by 4 percent from 1997, to 2.6 million cords.
- Aspen was the main species harvested with 574 thousand cords, an 11-percent decrease from the previous year. Other major species were red pine (307 thousand cords), jack pine (277 thousand cords), hard maple (220 thousand cords), white birch (199 thousand cords), and soft maple (181 thousand cords).

Minnesota

- Pulpwood production for woodpulp totaled 1.7 million cords in 1998, a decline of 2 percent from 1997.

- Wisconsin mills imported 550 thousand cords of pulpwood: 251 thousand cords from Michigan, 159 thousand cords from Minnesota, 100 thousand cords from other States, and 40 thousand cords from Canada. Wisconsin exported 158 thousand cords to Michigan, 45 thousand cords to Minnesota, and 1 thousand cords to other States. Roundwood accounted for 86 percent of the wood material exported and 70 percent of the wood material imported.
- The use of hardwood material in Wisconsin pulp mills decreased by 1 percent, and the use of softwood material decreased by 3 percent.

Particleboard Mills

Particleboard is a generic term for a panel manufactured from lignocellulosic material—commonly wood—essentially in the form of particles (as distinct from fibers). These materials are bonded together with synthetic resin or other suitable binder under heat and pressure by a process wherein the inter-particle bonds are created wholly by the added binder. Other materials may have been added during manufacture to improve certain properties. The many types of particleboard differ greatly in regard to size and geometry of the particle, the amount of resin (adhesive) used, and the density to which the panel is pressed. The major types of particles used for particleboard are shavings, flakes, wafers, chips, sawdust, strands, slivers, and wood wool (excelsior). Most particleboard in the U.S. is made from residues (shavings, sawdust, or chips), but some types require that roundwood (saw logs or pulpwood) be used. Waferboard and oriented strandboard are examples of products requiring that the particles be cut from solid wood. A new product called engineered lumber was added to this generic term in 1992. Wood material from the Lake States sent to mills in other States and Canada is included.

- The Lake States produced 2.7 million cords of pulpwood in 1998 for particleboard products, up 10 percent from 1997. For every cord of pulpwood used in particleboard manufacture, 94 percent came from roundwood and 6 percent came from the residues of other wood-using plants.
- Principal species harvested for particleboard products were aspen (2,078 thousand cords), white birch (112 thousand cords), jack pine (111 thousand cords), soft maple (103 thousand cords), and balsam poplar (77 thousand cords) (fig. 16).
- In 1998, the Lake States produced 135 thousand cords of softwood roundwood for particleboard plants, a decrease of 16 percent from 1997. Hardwood roundwood production for particleboard plants increased by 8 percent. All the roundwood that was harvested in the Lake States for particleboard production stayed in the region.
- The Lake States produced 87 thousand cords of softwood residues and 85 thousand cords of hardwood residues for use in particleboard production.
- Annual production at Lake States particleboard plants rose from 2,377 million square feet 3/4-inch basis in 1997 to 2,400 million square feet 3/4-inch basis in 1998 (table 10).
- Lake States pulpwood production for particleboard mills during 1994-1998 was:

Product form and species	Production				
	1994	1995	1996	1997	1998
(Thousand cords)					
Roundwood					
Softwoods	149	128	146	161	135
Aspen	2,146	2,079	2,102	1,946	2,078
Other hardwoods	303	245	281	306	362
Residue	161	163	179	86	172
Total	2,759	2,616	2,708	2,499	2,748

- Total softwood residue use at Lake States particleboard mills increased from 19 thousand cords in 1997 to 74 thousand cords in 1998. The use of hardwood residues by Lake States particleboard plants increased from 67 thousand cords in 1997 to 86 thousand cords in 1998.

Michigan

- Pulpwood harvested for particleboard products totaled 846 thousand cords in 1998, of which 119 thousand cords were softwoods and 727 thousand cords were hardwoods. Residues

used for particleboard products added another 105 thousand cords.

- The particleboard mills in Michigan imported 46 thousand cords from Wisconsin and 48 thousand cords from Canada. Exports of all wood material for particleboard production amounted to 34 thousand cords.

Minnesota

- Minnesota accounted for almost half (47 percent) of the wood material produced in the Lake States for particleboard plants in 1998.

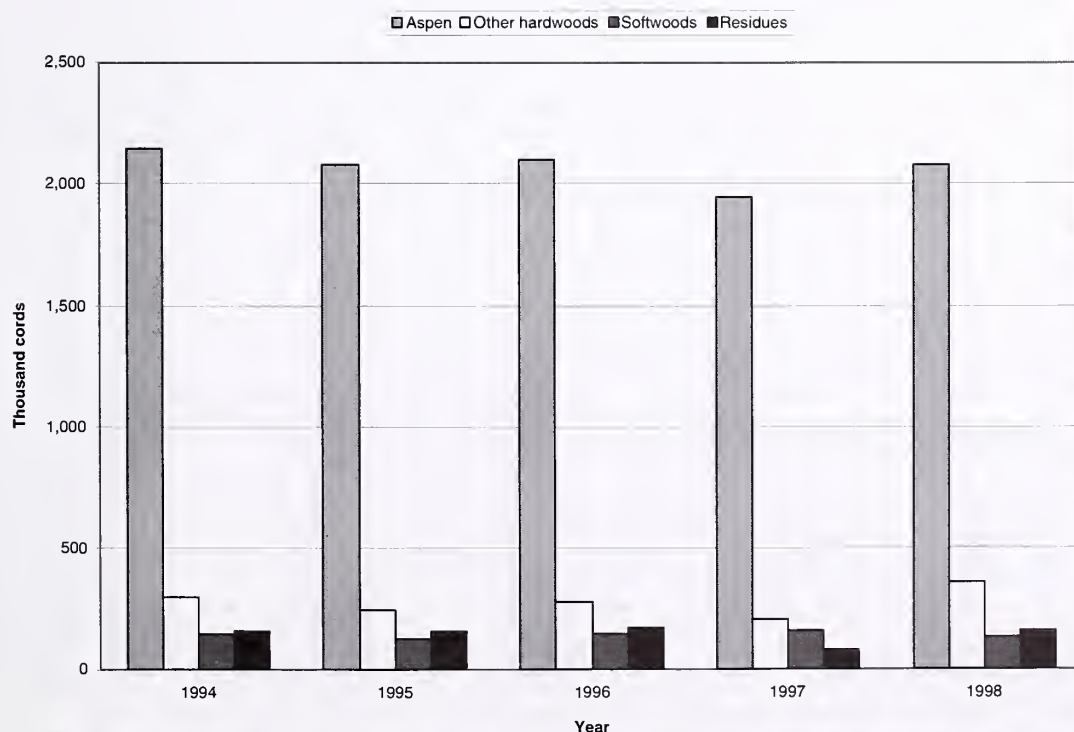


Figure 16.—Pulpwood production for particleboard in the Lake States, 1994-1998.

Timber logged for particleboard products totaled 1.3 million cords, and aspen was the predominant species cut (1.1 million cords). Minnesota supplied only 7 thousand cords of residues for particleboard production.

- The particleboard mills in Minnesota imported 25 thousand cords from Canada, 4 thousand cords from Wisconsin, and 3 thousand cords from the Plains States. In 1998, raw materials exported from the State for particleboard manufacturing totaled 92 thousand cords.

Wisconsin

- In 1998, Wisconsin produced 454 thousand cords of roundwood for particleboard manufacturing, of which 12 thousand cords were softwood and 442 thousand cords were hardwood. Wisconsin wood processing mills provided an additional 60 thousand cords of plant byproducts to the particleboard industry.
- The mills in Wisconsin imported 131 thousand cords of wood for particleboard manufacturing: 92 thousand cords from Minnesota, 21 thousand cords from Michigan, and 18 thousand cords from Canada. Wisconsin exported 45 thousand cords to Michigan and 4 thousand cords to Minnesota particleboard mills in 1998.

Industry News

Major mill expansion, new construction, consolidations, name changes, and closures are as follows:

- Aspen Bay Pulp and Fibre began building the first bleached chemi-thermomechanical pulp mill in the U.S. in Menominee, MI. The 215,000 tpy (tons per year) mill should be finished in late 2002.
- American Fibrit, Inc., in Battle Creek, MI, changed its name to Johnson Controls.
- The TENNECO Packaging mills in Filer City, MI, and Tomahawk, WI, were purchased and their names changed to Packaging Corporation of America in 1999.
- Avenor, Inc., in Thunder Bay, Ontario, was purchased by and its name changed to Bowater Forest Products.

CENTRAL STATES

PRODUCTION

- Pulpwood production in the Central States (Illinois, Indiana, Iowa, and Missouri) increased by almost 15 percent—from 412 thousand cords in 1997 to 472 thousand cords in 1998 (fig. 17). Illinois production rose by 13 percent, Indiana rose by 5 percent, Iowa fell by 4 percent, and Missouri rose by 33 percent above the 1997 production levels.
- Pulpwood production from roundwood increased by 10 percent in 1998 from 1997 levels. A 27-percent increase in exports to Southern States mills from the Central States accounted for this increase.
- Roundwood made up 38 percent of the total wood material used for pulpwood production in the Central States in 1998 (table 11).
- Pulpwood production from soft hardwood⁷ roundwood fell from 86 thousand cords in 1997 to 34 thousand cords in 1998. Hard hardwood⁸ production more than offset the loss in soft hardwood production by increasing from 67 thousand cords in 1997 to 126 thousand cords in 1998.
- Residue use for the production of pulpwood increased by 18 percent in 1998 from 1997. The production of softwood residues used for pulp production nearly doubled and hardwood residue use increased by 10 percent.

⁷ Hardwood species with an average specific gravity of 0.50 or less.

⁸ Hardwood species with an average specific gravity greater than 0.50.

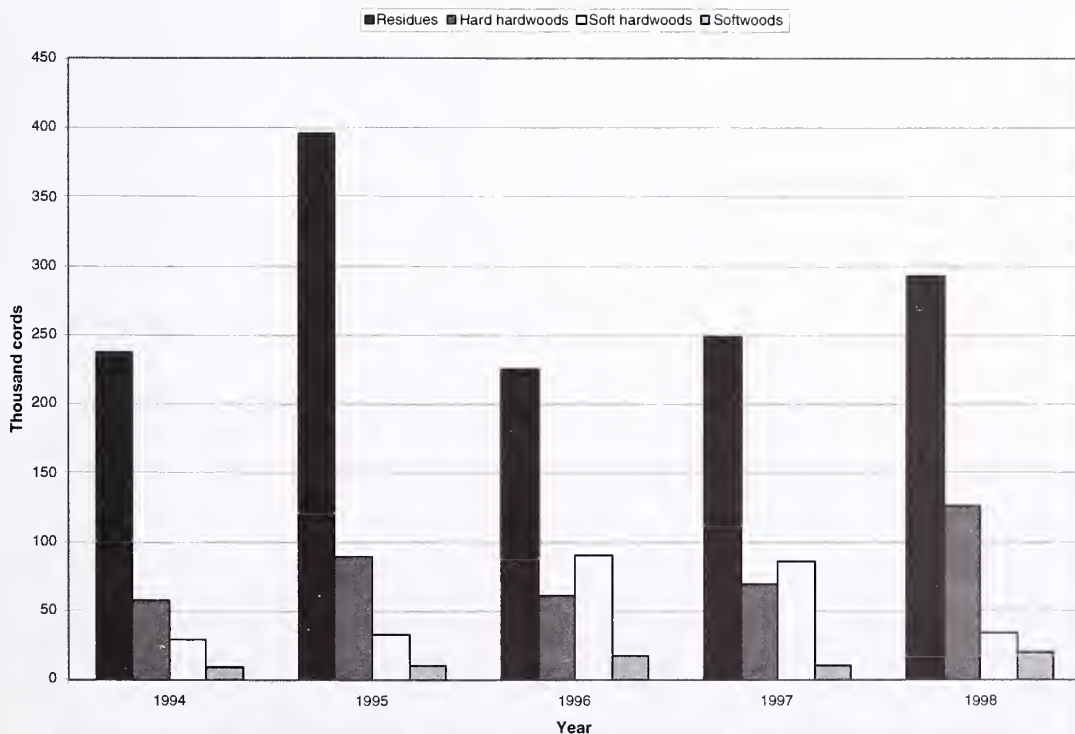


Figure 17.—Pulpwood production in the Central States, 1994-1998.

- Hardwood residue from primary wood-using mills made up 87 percent or 255 thousand cords of the 293 thousand cords of total residue used to produce pulp.
- Exports of roundwood and residues from the Central States in 1998 accounted for 72 percent of all wood material produced in the region for pulpwood production (table 12). Roundwood exports totaled 133 thousand cords and the export of residues from primary wood-using mills totaled 209 thousand cords.
- Loggers harvested pulpwood in 17 counties of Illinois, 13 counties in Indiana, 11 counties in Iowa, and 22 counties in Missouri (fig. 18).
- Pulpwood production from whole-tree chips decreased by 23 percent from 1997. The 43 thousand cords of whole-tree chips made up almost one-quarter of the total roundwood produced in the Central States in 1998.

Illinois

- Illinois produced 79 thousand cords of pulpwood in 1998, an increase of 13 percent from 1997. Illinois contributed 17 percent of the total pulpwood production in the Central States in 1998 (fig. 19).
- Illinois does not have any primary woodpulp or particleboard mills; consequently, all pulpwood harvested is shipped to plants outside the State.

Indiana

- Pulpwood production in Indiana accounted for 39 percent of the total pulpwood produced in the Central States region. The 183 thousand cords of wood material produced in Indiana in 1998 is a 5-percent increase from the 1997 level of 175 thousand cords.
- Roundwood production decreased by 5 percent in 1998, while residue production increased by 9 percent.

Iowa

- Iowa's total pulpwood production in 1998 was 34 thousand cords, a decrease of 4 percent from 1997. The State contributed 7 percent of the region's total pulpwood produced.
- Residues accounted for 72 percent of Iowa's pulpwood production in 1998.

Missouri

- Missouri remained the second largest producer of pulpwood in the Central States in 1998, with 37 percent of the region's total, or 176 thousand cords. The production of pulpwood in Missouri increased by 33 percent from 1997 to 1998.
- Missouri exported 93 percent (163 thousand cords) of the State's pulpwood production to mills in the Southern States.

RECEIPTS

- Pulp mills in three Central States received 138 thousand cords in 1998, down 2 percent from 1997 (table 13).
- Residue receipts increased by 11 percent from 83 thousand cords in 1997 to 92 thousand cords in 1998.
- Softwood roundwood was not used for pulpwood by the Central States pulp mills.

INDUSTRY TRENDS AND ANALYSIS

- Average daily woodpulp production increased from 843 tons in 1997 to 879 tons in 1998 (table 14).
- In 1998, only 36 percent of the roundwood and 30 percent of the residues produced for pulpwood in the Central States went to pulp mills located in the Central States.

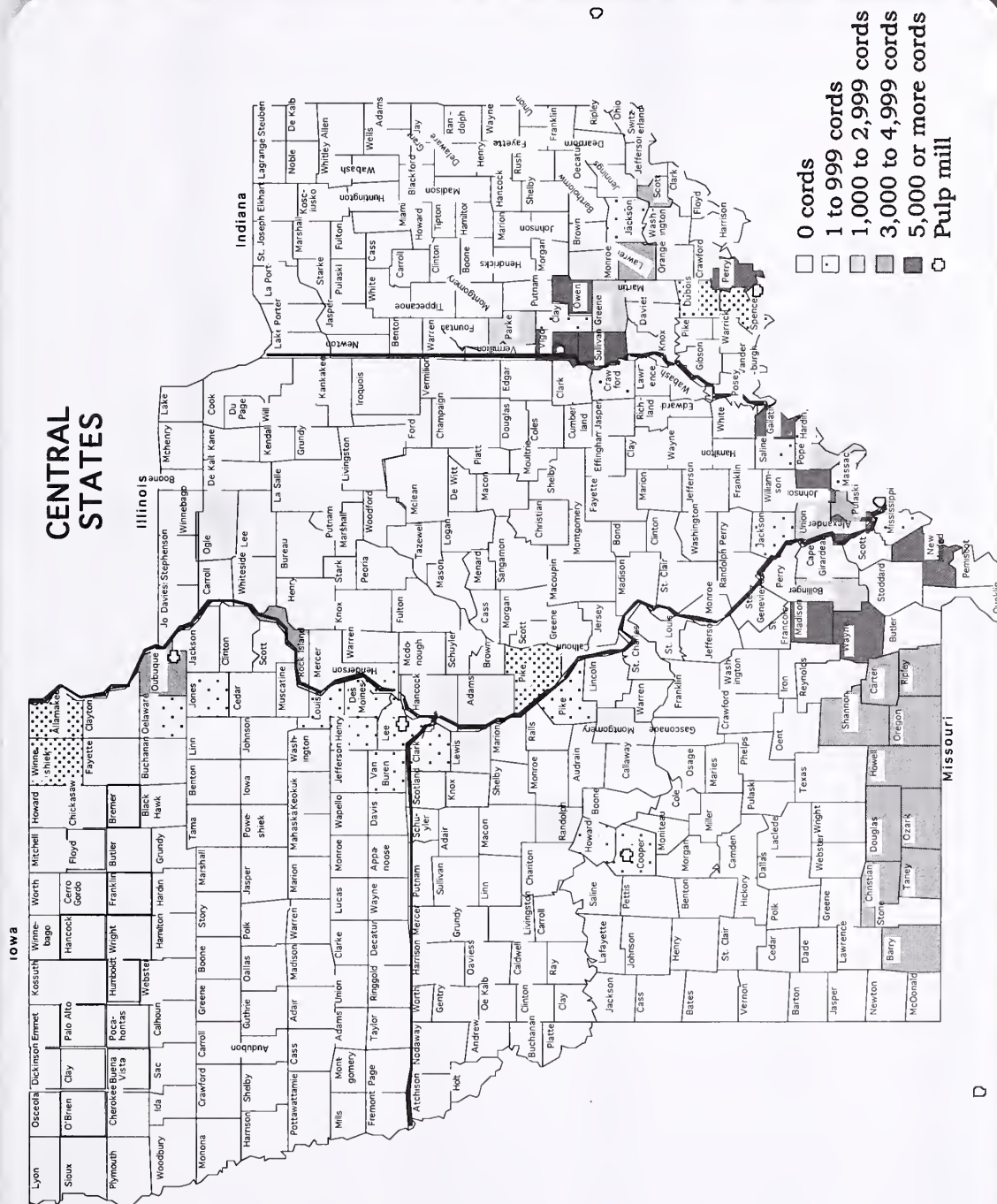
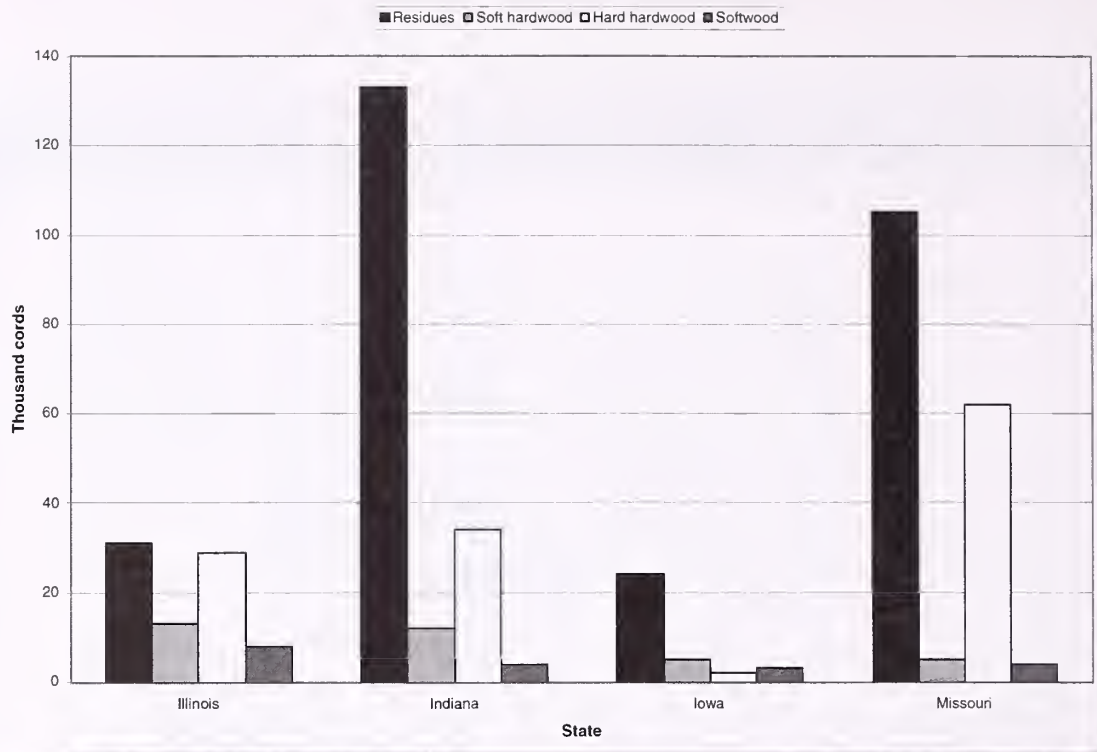


Figure 18.—Production of pulpwood from roundwood (including chips from roundwood) in the Central States by county, in standard cords, 1998. Locations of Central States mills and nearby pulp mills using Central States pulpwood are shown.

Figure 19.—*Central States pulpwood production by species group and residues, 1998.*



- Hardwood residue from sawmills and other wood-using mills accounted for 43 percent of all the wood material used by the Central States pulp mills. It continues to be the dominant form of wood material procured.

PLAINS STATES

PRODUCTION AND RECEIPTS

- Pulpwood production in the Plains States was 116 thousand cords in 1998, an increase of 3 percent from 1997 (fig. 20). Production came from Kansas, North Dakota, and South Dakota.
- Softwood residues accounted for 88 percent of the pulpwood production for the Plains States in 1998 (fig. 21), most of which came from South Dakota.
- Fifty-three thousand cords of softwood residue from the Plains States were exported to Wisconsin in 1998.
- Three thousand cords of aspen and balsam poplar roundwood from North Dakota were exported to Minnesota in 1998.

- The only mill in the Plains States in 1998 was Merillat Industries, Inc. (particleboard), in Rapid City, SD, which has an annual production capacity of 95 million square feet 3/4-inch basis.

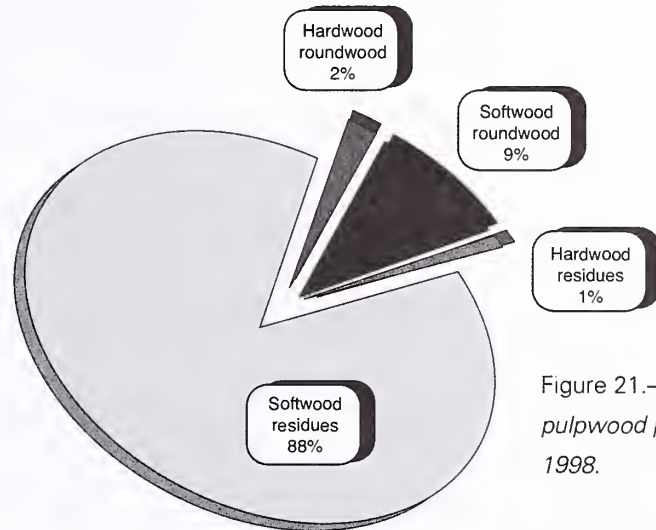


Figure 21.—*Plains States pulpwood production, 1998.*

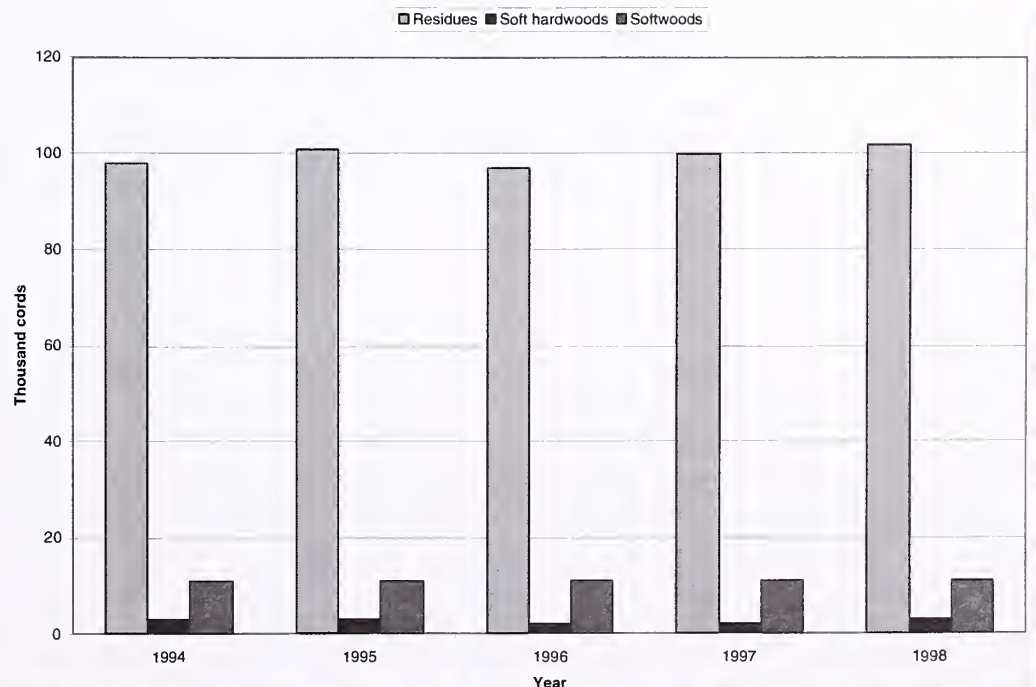


Figure 20.—*Pulpwood production in the Plains States, 1994-1998.*



APPENDIX

Conversion Factors Used In The North-Central Region

Standard cords of green roundwood per green ton:

Species	Factor	Species	Factor
Softwoods	0.4688	White birch	0.4018
Northern white-cedar	.6329	Yellow birch	.3723
Balsam fir	.4688	River birch	.3871
Hemlock	.4150	Sweetgum	.3669
Jack pine	.4688	Yellow-poplar	.4219
Red pine	.4688	Blackgum	.3779
White pine	.4777	Sycamore	.4083
Shortleaf pine	.3956	Cottonwood	.4291
Spruce	.5014	Elm	.4018
Tamarack	.4291	Hickory	.3701
Hardwoods	.3939	Hard maple	.3617
Soft hardwoods	.4171	Soft maple	.4083
Hard hardwoods	.3708	Black cherry	.4688
Ash	.4330	Red oak	.3444
Aspen	.4291	White oak	.3723
Balsam poplar	.4083	Black oak	.3444
Basswood	.5167	Other hardwoods	.4777
Beech	.3956		

TABLE TITLES

Table 1.—*Production and imports of pulpwood, Lake States, 1998*

Table 2.—*Lake States pulpwood production by State of origin, year, and destination, 1994-1998*

Table 3.—*Lake States pulpwood production by State of origin, product form, Forest Survey Unit, and destination, 1998*

Table 4.—*Lake States annual pulpwood production from roundwood by State, Forest Survey Unit, and species group, 1994-1998*

Table 5.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Michigan, 1998*

Table 6.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 1998*

Table 7.—*Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Wisconsin, 1998*

Table 8.—*Number of industrial pulp or particleboard plants in the Lake States by product form, species group used, and State, 1998*

Table 9.—*Average daily production of active woodpulp mill in the Lake States by State, company, location, and type of pulp produced, 1998*

Table 10.—*Annual production of active particleboard and panel mills in the Lake States by State, company, location, and product produced, 1998*

Table 11.—*Production and imports of pulpwood, Central States, 1998*

Table 12.—*Central States pulpwood production by State and destination, 1994-1998*

Table 13.—*Trends in receipts of roundwood and residue as pulpwood, Central States, 1994-1998*

Table 14.—*Average daily production of active woodpulp mills in the Central States by company, location, and type of pulp produced, 1998*

TABLES

Table 1.--Production and imports of pulpwood, Lake States, 1998 ¹
(In standard cords, unpeeled)

Product form, species group, and destination	Production by State ²				Regional total	Imports				Total receipts		
	Michigan	Minnesota	Wisconsin	Total		Central States	Plains States		Other U.S. ³		Canada	Total imports
Softwood roundwood												
Northern white-cedar												
Michigan	5,250	--	464	5,714	--	--	--	--	15	15	5,729	
Total	5,250	--	464	5,714	--	--	--	--	15	15	5,729	
Balsam fir												
Canada	5,372	--	--	5,372	--	--	--	--	--	--	--	
Michigan	47,518	--	4,157	51,675	--	--	--	--	135	135	51,810	
Minnesota	1,324	179,417	6,993	187,734	--	--	--	--	--	--	187,734	
Wisconsin	17,429	4,812	67,403	89,644	--	--	--	--	--	--	89,644	
Total	71,643	184,229	78,553	334,425	--	--	--	--	135	135	329,188	
Hemlock												
Michigan	63,789	--	7,378	71,168	--	--	--	--	310	310	71,478	
Wisconsin	3,387	--	16,003	19,389	--	--	--	--	--	--	19,389	
Total	67,176	--	23,381	90,557	--	--	--	--	310	310	90,867	
Jack pine												
Michigan	183,217	--	9,545	192,762	--	--	--	--	201	201	192,963	
Minnesota	--	40,410	1,347	41,757	--	--	--	--	15,971	15,971	57,728	
Wisconsin	25,297	27,029	271,155	323,482	79	--	--	--	--	79	323,561	
Total	208,514	67,439	282,048	558,001	79	--	--	--	16,172	16,252	574,252	
Red pine												
Michigan	79,259	--	7,104	86,363	--	--	--	--	191	191	86,554	
Minnesota	--	12,345	977	13,322	--	--	--	--	--	--	13,322	
Wisconsin	9,876	15,265	300,338	325,479	2,368	--	--	--	--	2,368	327,846	
Total	89,135	27,610	308,419	425,163	2,368	--	--	--	191	2,559	427,722	
White pine												
Michigan	3,167	--	238	3,405	--	--	--	--	8	8	3,412	
Minnesota	--	570	307	877	--	--	--	--	--	--	877	
Wisconsin	1,476	1,010	57,489	59,976	1,066	--	--	--	--	1,066	61,041	
Total	4,643	1,581	58,034	64,257	1,066	--	--	--	8	1,073	65,331	
Spruce												
Canada	10,797	--	--	10,797	--	--	--	--	--	--	--	
Michigan	21,722	--	1,874	23,596	--	--	--	--	61	61	23,657	
Minnesota	--	116,460	1,159	117,619	--	--	--	--	--	--	117,619	
Wisconsin	24,489	39,188	37,351	101,027	--	--	--	--	22,061	22,061	123,088	
Total	57,008	155,648	40,383	253,039	--	--	--	--	22,122	22,122	264,364	

Tamarack													
Michigan	3,958	--	384	4,342	--	--	--	12	12	12	12	4,354	4,354
Minnesota	--	2,034	--	2,034	--	--	--	--	--	--	--	2,034	2,034
Wisconsin	954	13,803	9,715	24,471	--	--	--	--	--	--	--	24,471	24,471
Total	4,911	15,836	10,099	30,847	--	--	--	12	12	12	12	30,859	30,859
Total softwood roundwood													
Canada	16,169	--	--	16,169	--	--	--	--	--	--	--	--	--
Michigan	407,880	--	31,144	439,024	--	--	--	932	932	932	932	439,956	439,956
Minnesota	1,324	351,236	10,783	363,343	--	--	--	15,971	15,971	15,971	15,971	379,314	379,314
Wisconsin	82,907	101,107	759,454	943,468	3,513	--	--	22,061	22,061	25,574	25,574	969,042	969,042
Total	508,280	452,343	801,381	1,762,003	3,513	--	--	38,965	38,965	42,477	42,477	1,788,312	1,788,312
Softwood residues													
Canada	13,536	19,137	457	33,130	--	--	--	--	--	--	--	--	--
Michigan	87,402	--	10,516	97,918	--	--	--	--	--	--	--	97,918	97,918
Minnesota	--	74,043	1,116	75,159	--	--	--	494	494	494	494	75,653	75,653
Wisconsin	69,001	--	95,693	164,695	--	52,869	41,414	11,351	105,634	105,634	105,634	270,329	270,329
Total	169,939	93,180	107,782	370,901	--	52,869	41,414	11,846	106,129	106,129	106,129	443,900	443,900
Total softwood material													
Canada	29,705	19,137	457	49,299	--	--	--	--	--	--	--	--	--
Michigan	495,282	--	41,660	536,942	--	--	--	932	932	932	932	537,874	537,874
Minnesota	1,324	425,279	11,899	438,502	--	--	--	16,466	16,466	16,466	16,466	454,968	454,968
Wisconsin	151,908	101,107	855,148	1,108,162	3,513	52,869	41,414	33,412	131,208	131,208	131,208	1,239,370	1,239,370
Total	678,218	545,523	909,163	2,132,905	3,513	52,869	41,414	50,810	148,606	148,606	148,606	2,232,212	2,232,212

(Table 1 continued on next page)

(Table 1 continued)

Product form, species group, and destination	Production by State ^a				Imports					Total receipts	
				Regional total	Central States	Plains States	Other U.S. ^b	Canada	Total imports		
	Michigan	Minnesota	Wisconsin								
Hardwood roundwood											
Ash											
Michigan	40,161	--	1,740	41,901	--	--	--	--	6	6	41,907
Minnesota	--	2,131	--	2,131	--	--	--	--	--	--	2,131
Wisconsin	3,994	3,222	73,316	80,532	--	--	--	--	--	--	80,532
Total	44,155	5,353	75,056	124,564	--	--	--	--	6	6	124,570
Aspen											
Michigan	800,276	--	45,639	845,915	--	--	--	--	48,599	48,599	894,515
Minnesota	--	1,982,926	28,737	2,011,663	--	2,601	--	--	64,496	67,098	2,078,761
Wisconsin	57,136	87,626	901,115	1,045,877	--	--	--	--	17,738	17,738	1,063,615
Total	857,412	2,070,552	975,491	3,903,455	--	2,601	--	--	130,834	133,435	4,036,890
Balsam poplar											
Michigan	72,076	--	5,154	77,230	--	--	--	--	52	52	77,282
Minnesota	--	110,986	75	111,062	--	85	--	--	9,735	9,820	120,882
Wisconsin	15	1,832	1,694	3,542	--	--	--	--	--	--	3,542
Total	72,091	112,819	6,924	191,834	--	85	--	--	9,787	9,872	201,706
Basswood											
Michigan	72,256	--	6,018	78,274	--	--	--	--	6	6	78,279
Minnesota	--	3,227	--	3,227	--	--	--	--	--	--	3,227
Wisconsin	1,618	512	34,918	37,047	--	--	--	--	--	--	37,047
Total	73,874	3,739	40,935	118,548	--	--	--	--	6	6	118,554
Beech											
Michigan	40,834	--	3,559	44,393	--	--	--	--	17	17	44,410
Wisconsin	6	--	1,027	1,033	--	--	--	--	--	--	1,033
Total	40,840	--	4,586	45,426	--	--	--	--	17	17	45,443
White birch											
Michigan	89,854	--	15,933	105,787	--	--	--	--	74	74	105,861
Minnesota	--	98,221	3,448	101,670	--	--	--	--	16	16	101,686
Wisconsin	8,956	36,526	184,487	229,969	--	--	--	--	7,106	7,106	237,075
Total	98,810	134,748	203,867	437,425	--	--	--	--	7,196	7,196	444,621
Yellow birch											
Michigan	39,818	--	4,452	44,270	--	--	--	--	29	29	44,299
Wisconsin	2,330	582	39,810	42,723	--	--	--	--	--	--	42,723
Total	42,148	582	44,263	86,993	--	--	--	--	29	29	87,022
Cottonwood											
Michigan	5,289	--	--	5,289	--	--	--	--	--	--	5,289
Wisconsin	15	--	1,919	1,935	--	--	--	--	--	--	1,935
Total	5,305	--	1,919	7,224	--	--	--	--	--	--	7,224

Product form, species group, and destination	Production by State ²				Imports				Total receipts	
	Michigan	Minnesota	Wisconsin	Regional total	Central States	Plains States	Other U.S. ³	Canada		Total imports
Total hardwood roundwood										
Michigan	2,057,280	--	148,632	2,205,912	--	--	--	49,304	49,304	2,255,217
Minnesota	--	2,205,815	35,203	2,241,018	--	2,687	--	74,247	76,934	2,317,952
Wisconsin	95,978	141,925	1,779,462	2,017,364	--	--	--	24,845	24,845	2,042,209
Total	2,153,258	2,347,740	1,963,296	6,464,295	--	2,687	--	148,396	151,083	6,615,377
Hardwood residues										
Canada	--	19,427	--	19,427	--	--	--	--	--	--
Michigan	220,097	--	13,272	233,369	14,896	--	--	--	14,896	248,265
Minnesota	--	54,214	2,503	56,717	--	--	--	17,750	17,750	74,467
Other ^a	--	--	1,492	1,492	--	--	--	--	--	--
Wisconsin	24,343	8,064	270,258	302,664	1,994	--	--	--	1,994	304,658
Total	244,440	81,705	287,525	613,669	16,890	--	--	17,750	34,640	627,390
Total hardwood material										
Canada	--	19,427	--	19,427	--	--	--	--	--	--
Michigan	2,277,377	--	161,905	2,439,282	14,896	--	--	49,304	64,200	2,503,482
Minnesota	--	2,260,029	37,705	2,297,734	--	2,687	--	91,998	94,684	2,392,419
Other ^a	--	--	1,492	1,492	--	--	--	--	--	--
Wisconsin	120,321	149,989	2,049,719	2,320,029	1,994	--	--	24,845	26,839	2,346,867
Total	2,397,698	2,429,445	2,250,821	7,077,964	16,890	2,687	--	166,147	185,723	7,242,768
Total all roundwood										
Canada	16,169	--	--	16,169	--	--	--	--	--	--
Michigan	2,465,160	--	179,776	2,644,936	--	--	--	50,236	50,236	2,695,173
Minnesota	1,324	2,557,051	45,986	2,604,361	--	2,687	--	90,219	92,905	2,697,266
Wisconsin	178,885	243,032	2,538,916	2,960,832	3,513	--	--	46,906	50,418	3,011,251
Total	2,661,538	2,800,083	2,764,677	8,226,298	3,513	2,687	--	187,361	193,560	8,403,689
Total all residues										
Canada	13,536	38,564	457	52,557	--	--	--	--	--	--
Michigan	307,499	--	23,789	331,287	14,896	--	--	--	14,896	346,183
Minnesota	--	128,257	3,619	131,876	--	--	--	18,245	18,245	150,121
Other ^a	--	--	1,492	1,492	--	--	--	--	--	--
Wisconsin	93,344	8,064	365,951	467,359	1,994	52,869	41,414	11,351	107,628	574,987
Total	414,378	174,885	395,307	984,571	16,890	52,869	41,414	29,596	140,769	1,071,291
Total all wood material										
Canada	29,705	38,564	457	68,726	--	--	--	--	--	--
Michigan	2,772,659	--	203,565	2,976,224	14,896	--	--	50,236	65,132	3,041,356
Minnesota	1,324	2,685,308	49,604	2,736,236	--	2,687	--	108,464	111,150	2,847,386
Other ^a	--	--	1,492	1,492	--	--	--	--	--	--
Wisconsin	272,228	251,096	2,904,867	3,428,191	5,507	52,869	41,414	58,257	158,047	3,586,237
Total	3,075,916	2,974,968	3,159,984	9,210,869	20,403	55,556	41,414	216,957	334,329	9,474,980

² Table may not add due to rounding.

³ Vertical columns of figures under the box heading "Production by State" present the amount of roundwood cut or residue generated in each State.

⁴ Mostly Western States.

⁵ Pulpwood shipped to mills outside of region.

Table 2.--Lake States pulpwood production by State of origin, year, and destination, 1994-1998¹

(In thousand standard cords, unpeeled)

MICHIGAN

Year	Total production	Destination of pulpwood			Other ²
		Michigan	Minnesota	Wisconsin	
1994	3,254	2,915	17	310	11
1995	3,112	2,733	18	346	16
1996	3,111	2,815	5	267	25
1997	3,346	3,104	1	223	18
1998	3,076	2,773	1	272	30
5-year average	3,180	2,868	8	284	20

MINNESOTA

Year	Total production	Destination of pulpwood			Other ²
		Michigan	Minnesota	Wisconsin	
1994	3,029	11	2,812	164	41
1995	2,971	4	2,738	178	50
1996	3,065	--	2,676	352	38
1997	2,980	--	2,654	287	39
1998	2,975	--	2,685	251	39
5-year average	3,004	3	2,713	246	41

WISCONSIN

Year	Total production	Destination of pulpwood			Other ²
		Michigan	Minnesota	Wisconsin	
1994	3,465	241	55	3,167	2
1995	3,482	231	80	3,168	2
1996	3,309	218	68	3,020	3
1997	3,194	234	45	2,913	2
1998	3,160	204	50	2,905	2
5-year average	3,322	226	60	3,035	2

¹ Includes mill residues used for pulp.

² Includes Canada.

Table 3.--Lake States pulpwood production by State of origin, product form,
Forest Survey Unit, and destination, 1998

(In thousand standard cords, unpeeled)

Product form and Forest Survey Unit	Total production	MICHIGAN			Destination of pulpwood		
		Michigan	Minnesota	Wisconsin	Minnesota	Wisconsin	Other ¹
Roundwood							
Eastern Upper Peninsula	590	550	--	26	--	26	14
Western Upper Peninsula	1,131	977	1	152	1	152	1
Northern Lower Peninsula	852	850	--	1	--	1	1
Southern Lower Peninsula	89	89	--	*	--	--	--
Total	2,662	2,465	1	179	1	179	16
Residues	414	307	--	93	--	93	14
Total pulpwood	3,076	2,773	1	272	1	272	30

Product form and Forest Survey Unit	Total production	MINNESOTA			Destination of pulpwood		
		Michigan	Minnesota	Wisconsin	Minnesota	Wisconsin	Other ¹
Roundwood							
Aspen-Birch	1,119	--	1,011	108	--	--	--
Northern Pine	1,357	--	1,309	48	--	--	--
Central Hardwood	253	--	166	87	--	--	--
Prairie	72	--	72	--	--	--	--
Total	2,800	--	2,557	243	--	--	--
Residues	175	--	128	8	--	--	39
Total pulpwood	2,975	--	2,685	251	--	--	39

Product form and Forest Survey Unit	Total production	WISCONSIN			Destination of pulpwood		
		Michigan	Minnesota	Wisconsin	Minnesota	Wisconsin	Other ¹
Roundwood							
Northeastern	874	160	1	714	1	714	--
Northwestern	1,119	18	44	1,057	44	1,057	--
Central	652	*	1	650	1	650	--
Southwestern	87	--	1	87	1	87	--
Southeastern	33	2	--	31	--	--	--
Total	2,765	180	46	2,539	46	2,539	--
Residues	395	24	4	366	4	366	2
Total pulpwood	3,160	204	50	2,905	50	2,905	2

* Less than 500 standard cords, unpeeled.

¹ Includes Canada.

Table 4.--Lake States annual pulpwood production from roundwood by State, Forest Survey Unit, and species group, 1994-1998
(In thousand standard cords, unpeeled)

Forest Survey Unit	MICHIGAN							
	All species				Pine			
	1994	1995	1996	1997	1998	1994	1995	1996
Eastern Upper Peninsula	773	774	689	633	590	111	147	126
Western Upper Peninsula	1,140	1,149	1,217	1,193	1,131	101	99	106
Northern Lower Peninsula	1,035	845	861	1,178	852	132	108	141
Southern Lower Peninsula	65	66	67	95	89	*	*	*
Total	3,013	2,834	2,834	3,099	2,662	344	355	373
MINNESOTA								
Aspen-Birch	1,318	1,263	1,321	1,046	1,119	46	40	38
Northern Pine	1,283	1,263	1,232	1,501	1,357	60	65	51
Central Hardwood	222	242	296	277	253	14	17	29
Prairie	35	43	48	52	72	--	--	--
Total	2,858	2,810	2,897	2,875	2,800	120	122	119
WISCONSIN								
Northeastern	1,066	1,020	1,003	980	874	135	132	158
Northwestern	1,312	1,334	1,210	1,134	1,119	242	228	231
Central	640	661	618	577	652	307	285	264
Southwestern	65	65	75	80	87	38	33	39
Southeastern	38	35	40	40	33	15	17	20
Total	3,121	3,115	2,945	2,811	2,765	738	695	712
Total Lake States	8,992	8,759	8,676	8,785	8,227	1,201	1,172	1,203
(Table 4 continued on next page)								
Spruce								
	1994	1995	1996	1997	1998	1994	1995	1996
Eastern Upper Peninsula	23	27	27	27	25	111	147	126
Western Upper Peninsula	38	39	50	27	31	101	99	106
Northern Lower Peninsula	1	1	1	1	1	132	108	141
Southern Lower Peninsula	--	--	*	*	*	*	*	*
Total	62	66	78	46	57	344	355	373
MINNESOTA								
Aspen-Birch	137	118	158	123	110	46	40	38
Northern Pine	29	31	44	43	41	60	65	51
Central Hardwood	1	1	3	3	4	14	17	29
Prairie	--	--	*	--	*	--	--	--
Total	165	150	204	168	156	120	122	119
WISCONSIN								
Northeastern	12	16	16	18	18	135	132	158
Northwestern	16	19	18	22	16	242	228	231
Central	1	3	1	2	3	307	285	264
Southwestern	1	2	1	1	2	38	33	39
Southeastern	1	1	1	1	2	15	17	20
Total	31	40	34	44	40	738	695	712
Total Lake States	258	256	318	259	253	1,201	1,172	1,203

(Table 4 continued)

Forest Survey Unit	Balsam fir					Other softwoods					Aspen				
	1994	1995	1996	1997	1998	1994	1995	1996	1997	1998	1994	1995	1996	1997	1998
MICHIGAN															
Eastern Upper Peninsula	55	34	25	20	28	43	30	32	24	22	181	192	152	125	148
Western Upper Peninsula	45	43	38	29	41	41	46	53	57	55	360	368	334	339	309
Northern Lower Peninsula	2	2	2	2	3	*	*	*	*	*	527	429	406	540	375
Southern Lower Peninsula	--	--	*	--	--	*	--	*	--	*	16	13	22	38	25
Total	103	79	65	52	72	84	76	85	82	77	1,084	1,003	913	1,041	857
MINNESOTA															
Aspen-Birch	114	119	171	106	101	2	11	11	12	9	862	831	816	649	736
Northern Pine	70	76	75	79	80	1	2	2	8	6	1,061	1,021	988	1,187	1,057
Central Hardwood	1	2	6	10	3	--	*	--	1	1	197	209	247	222	210
Prairie	--	--	*	--	*	--	*	--	--	*	35	43	47	50	68
Total	185	198	252	195	184	3	12	13	21	16	2,155	2,103	2,098	2,108	2,071
WISCONSIN															
Northeastern	31	30	41	32	36	32	27	26	24	22	393	397	367	328	313
Northwestern	31	41	50	44	42	9	7	7	8	10	573	614	539	481	469
Central	*	1	1	1	1	2	2	2	3	2	163	179	170	149	171
Southwestern	*	*	*	*	*	--	*	*	*	*	17	17	24	17	18
Southeastern	*	1	*	*	*	*	*	*	*	*	13	8	11	5	4
Total	63	73	92	78	79	42	37	36	34	34	1,159	1,214	1,109	980	975
Total Lake States	351	350	410	324	335	129	125	135	138	127	4,399	4,320	4,121	4,130	3,903

(Table 4 continued on next page)

(Table 4 continued)

Forest Survey Unit	MICHIGAN									
	Birch					Maple				
	1994	1995	1996	1997	1998	1994	1995	1996	1997	1998
Eastern Upper Peninsula	75	51	77	51	37	215	237	203	221	183
Western Upper Peninsula	87	84	144	87	71	351	375	370	430	414
Northern Lower Peninsula	50	42	35	40	33	163	156	188	266	172
Southern Lower Peninsula	1	*	*	1	*	8	11	16	23	23
Total	213	177	256	180	141	736	779	777	940	792
MINNESOTA										
Aspen-Birch	44	65	58	60	60	10	9	5	9	11
Northern Pine	30	38	45	55	69	10	4	1	1	1
Central Hardwood	1	8	7	8	6	6	4	4	5	7
Prairie	--	*	*	*	*	--	--	--	--	--
Total	75	111	109	123	135	26	17	9	15	19
WISCONSIN										
Northeastern	116	123	120	106	85	226	194	152	178	158
Northwestern	126	152	123	119	131	205	172	158	165	195
Central	18	28	27	24	28	60	59	64	51	65
Southwestern	1	3	3	5	3	4	5	4	7	5
Southeastern	1	2	1	2	1	2	3	2	4	2
Total	263	309	275	257	248	496	433	379	405	426
Total Lake States	550	596	641	559	524	1,259	1,229	1,165	1,360	1,237

* Less than 500 standard cords.

Table 5.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Michigan, 1998

(In standard cords, unpeeled)

Forest Survey Unit and county	All species	Northern white-cedar	Species group							Balsam poplar		
			Balsam fir	Hemlock	Jack pine	Red pine	White pine	Tamarack	Ash		Aspen	
Eastern Upper Peninsula												
Alger	92,513	293	2,916	2,376	4,971	3,321	150	1,747	257	1,267	10,646	1,092
Chippewa	93,307	495	5,302	1,434	11,815	7,736	452	5,011	289	364	34,076	771
Delta	93,725	512	6,643	2,776	8,176	7,293	380	4,946	578	482	24,532	2,254
Luce	68,191	105	1,275	6,652	6,387	5,919	54	2,428	87	614	12,647	628
Mackinac	88,192	356	5,094	1,499	8,014	6,574	169	3,774	206	420	31,908	1,044
Menominee	56,141	173	2,502	835	1,183	1,083	112	2,575	367	491	17,345	2,088
Schoolcraft	98,106	329	4,188	2,309	16,534	15,177	169	4,531	279	600	16,813	1,456
Total	590,176	2,263	27,920	17,881	57,079	47,102	1,486	25,012	2,063	4,238	147,968	9,333
Western Upper Peninsula												
Baraga	121,677	323	4,672	12,755	6,570	2,428	373	2,271	290	2,439	20,171	3,022
Dickinson	97,432	358	5,677	1,874	5,417	2,382	359	4,421	332	725	46,561	3,992
Gogebic	110,141	1	1,906	5,211	7,903	988	147	1,730	28	3,415	18,278	953
Houghton	163,469	332	5,000	3,922	2,727	4,037	320	3,867	275	4,323	38,412	4,953
Iron	183,253	804	11,942	4,234	8,278	7,175	524	6,955	1,008	2,581	50,475	5,976
Keweenaw	50,320	38	1,819	2,188	670	300	89	2,644	31	1,060	4,447	677
Marquette	242,874	888	8,906	15,470	15,021	6,675	481	6,567	854	1,869	67,214	8,414
Ontonagon	161,599	17	833	3,539	517	1,402	265	2,346	25	4,559	63,469	3,649
Total	1,130,766	2,761	40,755	49,192	47,102	25,386	2,559	30,801	2,841	20,970	309,027	31,637
Northern Lower Peninsula												
Alcona	42,608	--	30	--	940	1,045	--	--	--	281	25,489	8,572
Alpena	21,307	9	167	--	168	24	15	53	--	327	12,152	3,241
Antrim	26,930	19	153	--	8,887	253	43	37	--	473	6,084	85
Arenac	12,336	--	--	--	118	65	3	--	--	209	7,885	201
Bay	1,668	--	--	--	--	--	--	--	--	--	1,071	--
Benzie	20,390	--	--	--	1,848	9	7	--	--	1,851	5,485	55
Charlevoix	9,613	4	32	--	1,386	223	2	8	--	225	1,992	262
Cheboygan	68,889	67	863	--	11,077	828	130	424	--	228	37,102	1,810
Clare	26,518	--	--	--	444	381	--	--	--	1,030	13,599	380
Crawford	27,605	--	--	--	10,690	1,357	13	--	--	97	9,377	8
Emmet	25,852	3	22	--	2,975	202	71	5	--	156	12,982	901
Gladwin	36,190	--	--	--	513	162	2	--	--	609	21,168	1,206
Grand Traverse	13,127	--	--	--	1,833	245	4	--	--	623	4,759	19
Iosco	13,084	--	--	--	2,506	26	--	--	--	50	4,620	1,071
Isabella	22,947	--	--	--	678	142	1	--	--	161	13,010	759
Kalkaska	46,787	12	103	90	9,849	4,911	56	42	7	792	17,202	206
Lake	31,217	--	--	--	1,357	404	--	--	--	1,934	9,327	54
Leelanau	1,211	--	--	--	42	--	--	--	--	56	383	2

Manistee	26,895	--	--	--	1,655	81	--	--	--	1,823	7,931	437
Mason	10,006	--	--	--	--	--	--	--	--	640	3,145	224
Mecosta	14,879	--	--	--	285	91	--	--	--	73	6,944	550
Midland	19,841	--	--	--	50	150	--	--	--	1,149	9,140	86
Missaukee	37,119	--	--	--	4,074	933	--	--	--	821	17,389	182
Montmorency	29,519	--	68	--	2,466	88	10	54	--	303	13,526	3,214
Newaygo	22,746	--	--	--	10	38	--	--	--	802	6,254	163
Oceana	19,132	--	--	--	--	--	--	--	--	106	8,302	474
Ogemaw	15,130	--	3	--	1,100	36	10	--	--	441	7,828	638
Osceola	21,211	--	--	--	1,523	382	--	--	--	1,183	9,560	252
Oscoda	41,295	17	141	--	7,657	64	22	33	257	17,747	2,478	2,478
Otsego	51,932	--	15	--	13,207	2,190	150	10	380	19,435	291	291
Presque Isle	36,023	40	922	--	2,249	361	35	416	--	151	20,635	2,645
Roscommon	37,344	56	449	--	10,646	501	13	107	--	141	16,469	122
Wexford	20,631	--	--	--	2,736	1,358	--	--	--	1,160	7,139	63
Total	851,983	226	2,968	90	102,969	16,551	588	1,188	7	18,531	375,132	30,651

Southern Lower Peninsula

Allegan	11,716	--	--	--	--	--	--	--	--	--	--	1,459	--
Barry	1,026	--	--	--	--	--	--	--	--	--	--	158	--
Branch	1,683	--	--	--	--	--	--	--	--	--	--	191	--
Calhoun	1,074	--	--	--	--	--	--	--	--	--	--	121	--
Cass	2,365	--	--	--	--	--	--	--	--	--	--	268	--
Gratiot	20	--	--	--	--	--	--	--	--	--	--	16	--
Huron	502	--	--	--	--	--	--	--	--	--	--	502	--
Ingham	51	--	--	--	--	--	--	--	--	--	5	25	--
Ionia	30	--	--	--	--	--	--	--	--	--	--	17	--
Jackson	13	--	13	--	--	--	--	--	--	--	--	--	--
Kalamazoo	1,269	--	--	--	--	--	--	--	--	--	--	153	--
Kent	9,173	--	--	--	--	--	--	--	--	--	261	2,913	123
Montcalm	10,062	--	--	--	--	--	--	--	--	--	70	4,532	198
Muskegon	20,394	--	--	--	--	--	--	--	--	--	34	5,739	1
Oakland	1,876	--	--	--	--	840	5	--	--	--	--	888	--
Ottawa	3,235	--	--	--	--	--	--	--	--	--	--	784	60
Saginaw	569	--	--	--	--	--	1	--	--	--	--	331	24
Sanilac	488	--	--	13	--	--	--	--	--	--	--	242	--
Shiawassee	3,534	--	--	--	--	--	--	--	--	--	39	540	--
St. Joseph	5,084	--	--	--	--	--	--	--	--	--	--	574	--
Tuscola	1,084	--	--	123	90	--	--	--	--	--	--	843	--
Van Buren	10,551	--	--	--	--	--	--	--	--	--	--	3,156	64
Wayne	2,813	--	--	390	--	--	--	10	7	6	--	1,833	--

(Table 5 continued on next page)

(Tabel 5 continued)

Forest Survey Unit and county ¹	Species group											
	Basswood	Beech	White birch	Yellow birch	Cotton- wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Other hardwoods
Eastern Upper Peninsula												
Alger	2,287	3,369	2,733	3,443	--	1	--	24,148	24,753	502	5	2,234
Chippewa	751	339	4,161	857	--	--	--	7,657	10,825	380	--	593
Delta	1,010	1,139	5,423	1,590	--	1	--	13,086	11,576	188	7	1,133
Luce	1,032	1,413	1,250	1,687	--	--	--	12,166	12,502	235	--	1,112
Mackinac	725	971	4,658	1,181	--	--	--	9,975	10,654	142	--	826
Menominee	1,277	1,011	3,332	1,303	--	4	--	9,861	9,510	201	21	871
Schoolcraft	898	1,304	3,784	1,749	--	3	--	13,882	12,631	239	21	1,211
Total	7,979	9,545	25,340	11,809	--	9	--	90,775	92,452	1,887	55	7,980
Western Upper Peninsula												
Baraga	4,223	2,150	4,839	3,345	--	16	--	26,851	22,267	686	110	1,877
Dickinson	2,286	826	3,242	1,260	2	201	9	8,104	8,202	447	70	686
Gogebic	3,898	2,577	3,883	4,533	6	112	56	25,429	24,355	2,322	407	2,006
Houghton	8,471	2,971	4,948	4,931	--	12	--	39,285	31,146	1,011	80	2,447
Iron	4,271	3,072	7,988	4,101	--	22	3	30,963	29,341	792	132	2,617
Keweenaw	1,976	1,542	2,433	1,934	--	3	--	13,594	13,379	340	19	1,135
Marquette	4,316	3,665	11,599	5,266	2	5	1	43,452	37,860	668	26	3,654
Ontonagon	9,092	2,558	2,153	4,436	6	21	6	33,296	26,269	1,163	102	1,876
Total	38,534	19,360	41,085	29,806	15	393	75	220,974	192,819	7,428	945	16,299
Northern Lower Peninsula												
Alcona	767	281	1,616	--	--	--	--	1,741	1,846	--	--	--
Alpena	123	237	1,779	--	--	--	--	1,049	1,723	238	1	--
Antrim	1,852	188	2,239	6	--	--	7	2,747	3,428	213	219	--
Arenac	180	220	403	--	--	--	--	928	2,125	--	--	--
Bay	--	--	100	--	--	--	--	--	497	--	--	--
Benzie	1,155	488	582	45	--	--	66	2,025	3,095	1,822	1,858	--
Charlevoix	1,995	120	56	2	19	--	5	2,392	611	137	141	--
Cheboygan	958	325	3,641	--	--	--	--	2,465	8,120	851	--	--
Clare	516	256	470	26	735	--	37	1,683	3,983	1,469	1,508	--
Crawford	245	114	388	--	--	--	--	1,300	2,239	1,736	39	--
Emmet	434	197	1,610	--	--	--	--	1,550	4,566	161	19	--
Gladwin	706	443	1,532	16	499	--	22	1,153	5,056	1,450	1,652	--
Grand Traverse	620	152	268	15	--	--	22	815	2,341	786	625	--
Iosco	1,306	47	721	2	13	--	--	212	2,414	95	1	--
Isabella	302	480	502	4	475	148	6	1,278	4,527	292	182	--
Kalkaska	981	303	1,533	18	--	--	28	2,441	6,483	863	866	--
Lake	1,481	539	737	45	833	--	66	3,073	4,389	3,057	3,924	--
Leelanau	64	14	13	1	--	--	2	281	244	55	55	--

Manistee	1,009	820	486	44	--	--	67	2,744	5,079	2,290	2,428	--
Mason	385	407	193	16	--	--	24	1,319	2,076	773	805	--
Mecosta	82	548	137	101	--	--	2	1,043	3,604	683	736	--
Midland	562	257	619	28	--	--	40	1,309	3,845	1,277	1,330	--
Missaukee	810	381	1,177	19	--	--	30	1,911	7,750	810	832	--
Montmorency	1,651	367	1,791	18	--	--	19	2,524	2,550	780	90	--
Newaygo	412	401	317	20	293	69	30	1,685	5,421	3,340	3,492	--
Oceana	54	783	23	2	165	--	5	2,324	4,178	1,359	1,356	--
Ogemaw	288	147	699	10	--	--	15	995	1,785	737	398	--
Osceola	658	313	419	29	--	--	43	1,734	2,361	1,357	1,396	--
Oscoda	4,967	273	1,716	25	--	--	--	1,860	2,437	1,601	--	--
Oshtemo	1,222	605	2,208	--	--	--	--	4,395	7,728	96	--	--
Presque Isle	203	181	2,708	1	--	--	--	1,065	2,911	1,496	3	--
Roscommon	126	51	1,157	10	--	--	5	308	5,878	1,173	131	--
Wexford	646	308	340	29	--	--	41	1,549	2,800	1,207	1,254	--
Total	26,760	10,246	32,179	532	3,032	236	562	53,896	118,092	32,204	25,343	--
Southern Lower Peninsula												
Allegan	--	--	--	--	71	--	31	--	3,654	3,119	3,382	--
Barry	--	10	--	--	--	--	10	9	292	258	289	--
Branch	--	--	--	--	--	--	--	--	541	457	494	--
Calhoun	--	--	--	--	--	--	--	--	346	292	315	--
Cass	--	--	--	--	--	--	--	--	761	642	694	--
Gratiot	--	--	--	--	--	--	--	--	--	2	2	--
Huron	--	--	--	--	--	--	--	--	--	--	--	--
Ingham	--	5	--	--	5	2	4	--	4	--	--	--
Ionia	9	--	--	--	3	--	1	--	--	--	--	--
Jackson	--	--	--	--	--	--	--	--	--	--	--	--
Kalamazoo	--	--	--	--	--	--	--	--	405	342	369	--
Kent	78	179	--	--	387	--	111	505	1,856	1,278	1,482	--
Montcalm	--	192	9	--	278	--	120	643	2,002	970	1,048	--
Muskegon	17	777	7	1	714	112	412	737	5,059	3,187	3,597	--
Oakland	--	--	--	--	--	--	--	--	--	144	--	--
Ottawa	19	72	15	--	--	--	--	199	817	604	664	--
Saginaw	1	--	19	--	--	--	--	60	133	--	--	--
Sanilac	33	--	12	--	--	--	--	28	161	--	--	--
Shiawassee	233	71	--	--	193	36	1,332	65	367	314	344	--
St. Joseph	--	--	--	--	--	--	--	--	1,637	1,381	1,493	--
Tuscola	28	--	--	--	--	--	--	--	--	--	--	--
Van Buren	162	372	--	--	605	63	174	453	2,294	1,541	1,668	--
Wayne	22	11	143	--	--	--	--	77	314	--	--	--
Total	600	1,689	205	1	2,257	213	2,195	2,778	20,644	14,529	15,842	--
State total	73,874	40,840	98,810	42,148	5,305	851	2,832	368,423	424,006	56,049	42,184	24,279

Includes only those counties that supplied pulpwood in 1998.

Table 6.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Minnesota, 1998

(In standard cords, unpeeled)

Forest Survey Unit and county	All species	Species group								
		Balsam fir	Jack pine	Red pine	White pine	Spruce	Tamarack	Ash	Aspen	Balsam poplar
Aspen-Birch										
Carlton	73,252	10,586	4,110	935	7	1,713	208	490	47,127	1,398
Cook	38,978	4,682	248	7	10	4,242	588	16	27,649	195
Koochiching	336,703	31,530	5,608	--	--	45,288	6,751	350	215,773	28,469
Lake	114,251	10,183	2,264	800	285	11,061	417	1,877	72,420	2,321
St. Louis	555,419	44,314	15,900	2,676	140	48,178	1,220	466	373,042	21,572
Total	1,118,603	101,296	28,129	4,417	442	110,483	9,184	3,198	736,010	53,955
Northern Pine										
Aitkin	119,240	5,031	1,214	1,734	26	3,432	2,609	--	99,095	1,835
Becker	69,273	853	1,370	424	--	456	432	178	62,460	920
Beltrami	182,166	5,256	1,468	203	--	1,022	333	703	145,310	16,865
Cass	200,472	5,940	7,463	3,328	149	1,386	333	123	157,850	4,006
Clearwater	68,960	2,673	1,684	4	--	735	15	245	56,640	2,948
Crow Wing	86,755	1,098	4,551	1,825	25	233	--	--	74,938	61
Hubbard	115,270	667	3,905	169	--	350	11	178	101,868	1,301
Itasca	382,170	53,210	7,243	2,206	36	30,168	1,454	205	250,800	15,858
Lake of the Woods	64,332	4,791	1,204	25	--	2,195	204	--	49,415	6,328
Mahnomen	16,255	128	501	26	--	547	11	--	14,573	325
Roseau	35,892	612	517	--	--	892	393	--	30,325	3,118
Wadena	15,840	--	1,342	575	--	--	--	--	13,742	89
Total	1,356,626	80,259	32,461	10,518	236	41,415	5,794	1,632	1,057,016	53,655
Central Hardwood										
Anoka	513	147	85	261	8	--	--	--	11	--
Benton	554	--	--	268	22	--	--	--	263	--
Chisago	1,918	--	35	618	7	--	--	129	302	--
Dakota	14	--	--	--	--	14	--	--	--	--
Douglas	12	--	--	--	--	--	--	--	12	--
Goodhue	799	--	241	383	13	--	--	--	162	--
Hennepin	595	--	48	435	111	--	--	--	--	--
Isanti	2,133	13	102	907	26	6	--	--	1,080	--
Kanabec	30,121	57	745	1,427	66	433	313	--	26,436	12
Mille Lacs	27,028	25	--	13	--	625	--	--	26,273	3
Morrison	26,849	251	808	922	--	484	208	--	23,660	59
Olmsted	1,066	--	1,042	24	--	--	--	--	--	--
Otter Tail	28,672	--	--	24	--	--	--	--	28,215	406

Pine	116,207	2,055	1,278	3,061	14	842	313	249	96,515	919
Rice	44	--	--	44	--	--	--	--	--	--
Sherburne	6,708	28	1,406	2,960	365	893	--	123	202	--
Stearns	13	--	--	--	--	--	--	--	13	--
Todd	6,376	30	521	283	--	214	--	--	5,320	8
Wabasha	1,611	--	279	113	16	60	--	4	1,119	--
Winona	1,548	--	110	930	255	88	--	18	22	--
Total	252,777	2,607	6,700	12,674	903	3,659	833	523	209,604	1,407
Prairie										
Kittson	21,281	53	119	--	--	52	20	--	20,286	751
Marshall	20,622	13	30	--	--	13	5	--	17,979	2,577
Norman	7,725	--	--	--	--	--	--	--	7,665	45
Pennington	9,300	--	--	--	--	--	--	--	9,188	112
Polk	9,150	--	--	--	--	27	--	--	8,812	311
Red Lake	3,998	--	--	--	--	--	--	--	3,992	6
Total	72,077	67	149	--	--	92	25	--	67,923	3,802
State total	2,800,083	184,229	67,439	27,610	1,581	155,648	15,836	5,353	2,070,552	112,819

(Table 6 continued on next page)

(Table 6 continued)

Forest Survey Unit and county ¹	Bass- wood	White birch	Yellow birch	Species group							White oak	Other hardwoods	
				Elm	Hickory	Hard maple	Soft maple	Red oak					
Aspen-Birch													
Carlton	67	3,722	194	10	9	1,160	1,269	214	9	24			
Cook	--	1,310	--	--	--	5	26	--	--	--			
Koochiching	--	2,919	--	--	--	--	13	--	--	--			
Lake	--	11,149	--	--	--	--	1,476	--	--	--			
St. Louis	38	40,845	--	--	--	1,890	5,137	*	--	--			
Total	105	59,946	194	10	9	3,056	7,922	214	9	24			
Northern Pine													
Aitkin	--	4,264	--	--	--	--	--	--	--	--			
Becker	290	1,891	--	--	--	--	--	--	--	--			
Beltrami	1,240	9,767	--	--	--	--	--	--	--	--			
Cass	385	19,509	--	--	--	--	--	--	--	--			
Clearwater	635	3,381	--	--	--	--	--	--	--	--			
Crow Wing	--	4,023	--	--	--	--	--	--	--	--			
Hubbard	307	6,514	--	--	--	--	--	--	--	--			
Itasca	376	19,454	--	--	--	15	1,147	--	--	--			
Lake of the Woods	--	170	--	--	--	--	--	--	--	--			
Mahnomen	--	145	--	--	--	--	--	--	--	--			
Roseau	--	34	--	--	--	--	--	--	--	--			
Wadena	--	93	--	--	--	--	--	--	--	--			
Total	3,233	69,245	--	--	--	15	1,147	--	--	--			
Central Hardwood													
Anoka	--	--	--	--	--	--	--	--	--	--			
Benton	--	--	--	--	--	--	--	--	--	--			
Chisago	67	--	194	10	9	197	101	214	9	24			
Dakota	--	--	--	--	--	--	--	--	--	--			
Douglas	--	--	--	--	--	--	--	--	--	--			
Goodhue	--	--	--	--	--	--	--	--	--	--			
Hennepin	--	--	--	--	--	--	--	--	--	--			
Isanti	--	--	--	--	--	--	--	--	--	--			
Kanabec	--	298	--	--	--	--	335	--	--	--			
Mille Lacs	--	89	--	--	--	--	--	--	--	--			
Morrison	--	456	--	--	--	--	--	--	--	--			
Olmsted	--	--	--	--	--	--	--	--	--	--			
Otter Tail	--	26	--	--	--	--	--	--	--	--			

Pine	333	4,151	194	10	9	2,453	3,564	214	9	24
Rice	--	--	--	--	--	--	--	--	--	--
Sherburne	--	441	--	--	--	38	197	43	14	--
Stearns	--	--	--	--	--	--	--	--	--	--
Todd	--	*	--	--	--	--	--	--	--	--
Wabasha	--	14	--	--	--	1	6	--	--	--
Winona	--	64	--	--	--	5	28	21	7	--
Total	400	5,537	388	20	19	2,694	4,232	491	39	48
Prairie										
Kittson	--	--	--	--	--	--	--	--	--	--
Marshall	--	5	--	--	--	--	--	--	--	--
Norman	--	15	--	--	--	--	--	--	--	--
Pennington	--	--	--	--	--	--	--	--	--	--
Polk	--	--	--	--	--	--	--	--	--	--
Red Lake	--	--	--	--	--	--	--	--	--	--
Total	--	20	--	--	--	--	--	--	--	--
State total	3,739	134,748	582	30	28	5,765	13,301	704	49	72

* Less than 1/2 cord.

' Includes only those counties that supplied pulpwood in 1998.

Table 7.--Pulpwood production from roundwood by Forest Survey Unit, county, and species group, Wisconsin, 1998

(In standard cords, unpeeled)

Forest Survey Unit and county ¹	All species	Species group						Balsam poplar				
		N. white- cedar	Balsam fir	Hemlock	Jack pine	Red pine	White pine		Spruce	Tamarack	Ash	Aspen
Northeastern												
Florence	52,328	37	1,742	4,877	5,395	6,533	522	632	223	786	17,371	641
Forest	114,257	--	5,507	2,098	551	4,157	414	3,193	1,474	4,344	39,754	1,353
Langlade	125,202	--	6,728	875	1,213	3,529	676	1,640	152	4,779	47,707	393
Lincoln	92,984	--	3,361	685	2,403	2,808	798	1,177	966	3,990	41,446	40
Marinette	100,266	--	3,131	522	19,265	14,464	1,360	742	303	1,163	34,211	1,150
Menominee	84,265	427	4,029	5,626	8,353	10,811	1,665	1,730	353	1,806	27,377	504
Oconto	37,749	--	2,002	117	1,682	2,741	317	1,474	72	325	20,476	632
Oneida	113,214	--	5,986	646	4,528	13,800	3,134	4,515	993	4,394	29,367	132
Shawano	33,991	--	106	323	197	5,874	334	100	13	857	18,427	14
Vilas	119,891	--	3,679	192	20,059	9,210	2,244	2,869	1,178	3,451	37,253	213
Total	874,145	464	36,271	15,962	63,646	73,927	11,462	18,072	5,727	25,896	313,389	5,073
Northwestern												
Ashtland	75,412	--	3,263	331	1,460	1,387	705	2,662	409	2,649	35,549	42
Barron	21,361	--	63	116	497	1,159	108	32	--	439	13,089	*
Bayfield	168,469	--	4,639	54	20,096	9,774	1,057	1,857	113	3,375	81,569	548
Burnett	63,242	--	303	7	19,706	3,965	238	262	32	538	27,878	2
Douglas	156,131	--	13,042	10	27,747	16,353	294	2,057	263	1,301	61,026	848
Iron	147,367	--	4,861	532	761	976	10	1,424	100	6,380	66,794	121
Polk	22,580	--	70	--	5,406	1,348	66	27	--	268	12,237	*
Price	91,137	--	7,409	3,454	4,083	1,874	964	2,540	1,732	4,406	20,347	48
Rusk	59,169	--	328	45	201	751	224	185	138	2,377	25,810	7
Sawyer	173,026	--	5,061	446	1,559	2,229	1,596	3,897	477	8,733	60,217	20
Taylor	62,157	--	2,274	1,032	18	1,673	58	500	359	2,934	24,319	12
Washburn	78,621	--	193	--	14,552	7,487	587	402	303	858	39,737	1
Total	1,118,673	--	41,506	6,029	96,087	48,977	5,907	15,846	3,925	34,260	468,572	1,649
Central												
Adams	84,871	--	--	--	36,824	20,575	3,899	--	--	170	5,977	--
Chippewa	28,906	--	--	32	517	1,766	401	43	48	718	14,476	1
Clark	91,522	--	3	14	3,869	3,054	1,909	65	--	3,276	41,991	4
Eau Claire	24,096	--	--	--	2,501	3,600	464	77	149	805	6,483	*
Jackson	49,416	--	20	16	10,824	8,348	3,432	79	20	884	11,400	1
Juneau	51,250	--	--	--	20,034	10,457	844	--	--	396	2,082	--
Marathon	92,646	--	346	797	1,290	7,333	446	858	--	4,727	33,847	37
Marquette	13,788	--	31	--	1,243	9,705	955	42	48	55	361	*
Monroe	71,122	--	16	--	22,927	25,622	6,510	31	54	578	4,207	*
Portage	50,898	--	54	354	6,059	13,198	1,748	645	36	425	22,692	2
Waupaca	21,593	--	33	11	437	9,626	899	132	14	455	5,187	1
Waushara	32,968	--	--	--	2,943	22,751	2,382	36	64	264	1,267	--
Wood	38,545	--	9	96	3,447	3,796	1,552	595	--	552	21,051	1
Total	651,621	--	513	1,320	112,916	139,830	25,441	2,603	433	13,303	171,020	48

Southwestern

Buffalo	5,119	--	--	--	46	500	266	79	--	50	3,688	*
Crawford	230	--	--	--	--	--	--	--	--	6	--	--
Dunn	18,686	--	13	42	1,240	4,605	1,401	22	--	402	6,201	--
Grant	7,447	--	14	--	113	5,735	318	214	--	99	5	--
Iowa	1,126	--	--	--	--	220	453	185	--	--	--	--
La Crosse	8,112	--	--	16	3,738	2,815	679	11	--	41	480	--
Lafayette	10	--	--	--	--	--	--	--	--	1	--	--
Pepin	1,468	--	--	--	--	--	--	--	--	37	934	4
Pierce	1,556	--	--	--	--	695	270	16	--	27	303	1
Richland	1,350	--	--	--	6	342	360	30	--	11	477	--
Sauk	10,987	--	--	--	976	5,227	1,744	817	--	71	161	--
St Croix	11,089	--	155	--	1,878	3,310	455	125	--	120	3,104	4
Trempealeau	14,114	--	--	--	145	5,802	2,733	325	--	307	2,726	1
Vernon	5,820	--	--	--	59	2,744	1,965	414	--	11	368	--
Total	87,115	--	181	57	8,200	31,994	10,645	2,238	--	1,185	18,447	10

Southeastern

Brown	1,805	--	15	--	58	330	--	--	--	49	761	21
Calumet	985	--	--	--	19	--	--	--	--	36	465	4
Columbia	14,116	--	--	--	889	7,289	1,229	66	--	140	932	--
Dane	496	--	--	--	38	82	75	82	--	18	44	--
Dodge	232	--	--	--	--	28	13	180	--	--	7	--
Door	3,610	--	49	--	56	476	661	72	--	23	1,000	119
Fond Du Lac	227	--	--	--	--	--	--	--	--	13	29	--
Green Lake	536	--	--	--	--	157	41	--	--	8	56	--
Jefferson	1,104	--	--	--	--	731	323	13	--	5	--	--
Kenosha	214	--	--	--	--	147	38	29	--	--	--	--
Kewaunee	788	--	--	--	--	616	--	11	--	3	138	--
Manitowoc	1,567	--	18	--	--	438	509	381	--	9	141	--
Outagamie	1,226	--	--	--	--	60	54	--	--	78	467	--
Ozaukee	59	--	--	--	--	--	50	--	--	1	--	--
Racine	141	--	--	--	--	37	104	--	--	--	--	--
Rock	275	--	--	--	--	103	172	--	--	--	--	--
Sheboygan	1,474	--	--	--	--	516	471	410	14	9	--	--
Walworth	2,354	--	--	14	--	1,961	306	37	--	4	--	--
Washington	1,118	--	--	--	--	469	335	314	--	--	--	--
Waukesha	436	--	--	--	--	89	161	32	--	14	24	--
Winnebago	360	--	--	--	138	161	39	--	--	3	--	--
Total	33,124	--	82	14	1,198	13,690	4,579	1,625	14	412	4,063	144
State total	2,764,677	464	78,553	23,381	282,048	308,419	58,034	40,383	10,099	75,056	975,491	6,924

(Table 7 continued on next page)

(Table 7 continued)

Forest Survey Unit and county ¹	Species group											
	Bass- wood	Beech	White birch	Yellow birch	Cotton- wood	Elm	Hickory	Hard maple	Soft maple	Red oak	White oak	Other hardwoods
Northeastern												
Florence	577	316	3,253	496	1	300	--	3,923	3,645	577	275	205
Forest	1,858	758	8,753	2,339	10	4,970	13	15,563	14,199	1,807	628	514
Langlade	2,812	844	11,899	3,272	25	1,330	63	17,443	15,100	3,089	816	816
Lincoln	3,517	13	7,455	4,122	42	675	175	8,091	5,082	4,977	637	523
Marinette	1,098	631	4,893	991	1	107	2	7,334	7,115	910	399	476
Menominee	227	296	1,576	1,112	2	1,573	1	8,169	7,952	258	129	287
Oconto	578	212	1,856	301	3	31	--	2,278	2,299	141	52	160
Oneida	4,668	144	12,389	3,439	66	293	125	11,159	7,761	4,301	832	542
Shawano	68	43	835	361	*	1,072	1	2,433	2,352	371	193	14
Vilas	2,994	198	12,606	2,921	36	539	105	9,036	6,581	3,446	605	476
Total	18,398	3,455	65,515	19,354	185	10,891	485	85,428	72,086	19,878	4,566	4,014
Northwestern												
Ashland	366	69	7,836	790	2	2,170	3	7,470	6,880	922	407	39
Barron	131	4	1,941	228	*	139	6	1,225	1,206	771	183	22
Bayfield	2,568	1	19,181	1,758	36	237	54	8,887	7,650	3,598	1,195	223
Burnett	153	--	2,822	266	1	35	9	1,504	3,099	1,686	708	29
Douglas	546	--	18,219	199	2	53	1	3,905	9,410	575	264	17
Iron	4,881	546	7,454	5,800	30	4,952	176	20,107	14,495	5,463	701	802
Polk	71	--	1,538	69	*	13	2	501	673	222	61	7
Price	3,488	24	11,716	2,643	50	958	94	11,590	9,350	3,368	662	337
Rusk	1,803	25	5,986	1,031	782	1,440	28	7,417	7,734	2,242	511	104
Sawyer	2,034	19	27,880	2,260	3	1,002	16	24,991	23,725	4,649	2,026	184
Taylor	1,092	73	6,364	1,124	168	2,411	20	8,539	7,407	1,284	406	91
Washburn	328	1	3,927	256	1	66	7	2,476	4,845	2,203	362	28
Total	17,460	762	114,863	16,424	1,076	13,476	417	98,611	96,474	26,982	7,485	1,884
Central												
Adams	33	--	184	75	--	5	3	529	463	13,401	2,722	9
Chippewa	772	--	2,649	527	544	382	20	1,933	2,319	1,278	421	60
Clark	779	16	7,266	1,420	81	709	37	9,133	7,145	7,629	2,980	141
Eau Claire	177	1	1,642	416	*	62	13	2,110	1,498	2,768	1,286	44
Jackson	297	--	1,050	732	1	55	30	2,038	1,377	6,865	1,863	86
Juneau	106	--	304	296	--	19	13	1,046	852	11,534	3,232	35
Marathon	601	302	3,681	2,152	7	9,136	14	12,701	11,910	1,814	585	64
Marquette	33	--	27	63	*	8	3	106	69	784	245	8
Monroe	222	--	414	580	*	35	26	1,275	900	5,973	1,681	69
Portage	191	1	785	171	3	48	3	1,181	934	1,644	707	17
Waupaca	111	9	337	276	1	290	7	1,219	1,165	1,016	346	21
Waushara	105	--	80	322	--	20	15	507	338	1,455	381	38
Wood	146	5	2,040	178	1	166	1	1,529	1,094	1,505	766	15
Total	3,573	334	20,460	7,206	639	10,936	186	35,308	30,064	57,666	17,215	608

Southwestern

Buffalo	33	--	105	53	*	3	2	99	60	101	26	6
Crawford	1	--	16	2	--	--	--	19	13	115	59	--
Dunn	89	--	1,005	233	--	29	8	1,060	988	942	382	25
Grant	--	--	103	2	--	4	--	388	384	46	23	--
Iowa	--	--	--	--	--	--	--	--	--	238	30	--
La Crosse	20	--	3	61	--	3	3	66	35	109	24	8
Lafayette	--	--	3	--	--	--	--	3	2	1	--	--
Pepin	243	--	2	55	4	3	3	58	30	75	10	11
Pierce	44	--	43	18	1	2	1	63	41	25	5	3
Richland	1	--	28	3	--	1	--	32	23	23	11	--
Sauk	19	--	102	43	--	4	1	191	143	1,135	348	5
St Croix	252	--	739	74	4	8	3	297	369	138	39	13
Trempealeau	175	--	51	427	1	23	20	518	293	485	31	52
Vernon	1	--	27	3	--	1	--	31	22	118	56	--
Total	878	--	2,227	974	11	81	40	2,825	2,403	3,550	1,045	124

Southeastern

Brown	248	--	14	59	4	3	3	95	71	60	4	11
Calumet	242	--	--	54	4	3	3	55	28	59	3	11
Columbia	18	--	275	43	--	7	1	416	320	1,696	791	4
Dane	7	--	43	4	--	1	--	49	34	15	5	--
Dodge	4	--	--	--	--	--	--	--	--	--	--	--
Door	76	34	360	42	--	--	--	289	317	9	1	25
Fond Du Lac	1	--	27	4	--	1	--	37	29	57	29	--
Green Lake	3	--	5	9	--	*	*	14	9	157	75	1
Jefferson	--	--	7	2	--	--	--	12	11	1	1	--
Kenosha	--	--	--	--	--	--	--	--	--	--	--	--
Kewaunee	--	--	2	1	--	--	--	9	10	--	--	--
Manitowoc	--	--	16	1	--	--	--	27	23	3	2	--
Outagamie	24	1	20	66	--	38	2	182	172	53	2	6
Ozaukee	--	--	*	*	--	--	--	3	4	--	--	--
Racine	--	--	--	--	--	--	--	--	--	--	--	--
Rock	--	--	--	--	--	--	--	--	--	--	--	--
Sheboygan	4	--	--	13	--	1	1	13	7	14	1	2
Walworth	--	--	2	2	--	--	--	13	15	--	--	--
Washington	--	--	--	--	--	--	--	--	--	--	--	--
Waukesha	1	--	29	4	--	1	--	40	32	5	3	--
Winnebago	--	--	1	1	--	--	--	8	9	--	--	--
Total	627	35	801	304	9	55	9	1,264	1,090	2,130	918	60

State total	40,935	4,586	203,867	44,263	1,919	35,439	1,137	223,436	202,118	110,205	31,229	6,691
<i>Less than 1/2 cord.</i>												

* Includes only those counties that supplied pulpwood in 1998.

Table 8.--Number of industrial pulp or particleboard plants in the Lake States
by product form, species group used, and State, 1998

Product form and species group	Total		State	
	Lake States	Michigan	Minnesota	Wisconsin
Roundwood				
Softwoods				
Northern white-cedar	2	2	--	--
Balsam fir	17	4	5	8
Hemlock	6	1	--	5
Jack pine	12	3	4	5
Red pine	13	4	4	5
White pine	9	2	2	5
Spruce	17	3	7	7
Tamarack	6	1	1	4
Total plants using softwoods ¹	23	5	9	9
Hardwoods				
Ash	16	7	2	7
Aspen	40	10	15	15
Balsam poplar	17	7	8	2
Basswood	15	9	1	5
Beech	8	7	--	1
White birch	23	9	7	7
Yellow birch	10	6	--	4
Cottonwood	3	1	--	2
Elm	5	1	--	4
Hickory	3	2	--	1
Hard maple	17	9	1	7
Soft maple	19	10	1	8
Red oak	13	7	--	6
White oak	7	3	--	4
Other hardwoods	5	3	--	2
Total plants using hardwoods ¹	45	11	15	19
Total plants using roundwood¹	47	12	16	19
Residues				
Softwood	11	2	3	6
Hardwood	18	6	4	8
Total plants using residues ¹	20	6	5	9
Total plants¹	49	12	16	21

¹ Some plants use more than one species, so numbers in columns are not additive.

Table 9.--Average daily production of active woodpulp mills in the Lake States by State, company, location, and type of pulp produced, 1998

(In tons per 24 hours)

State and company	Location	Average daily production	Type of pulp				Thermo-mechanical
			Sulfite	Kraft	Groundwood/mechanical	Semi-chemical	
Michigan							
ABT Co.	Alpena	250	--	--	250	--	--
Champion International Corp.	Quinnesec	1,140	--	1,140	--	--	--
Johnson Controls	Battle Creek	8	--	--	--	--	8
Mead Corp.	Escanaba	1,760	--	1,760	--	--	--
Menasha Corp.	Otsego	660	--	--	--	660	--
SAPPI / S. D. Warren Co.	Muskegon	304	--	304	--	--	--
Smurfit-Stone Container Corp.	Ontonagon	517	--	--	--	517	--
Tenneco Packaging	Filer City	593	--	--	--	593	--
Total	8 mills	5,232	--	3,204	250	1,770	8
Minnesota							
Blandin Paper Co.	Grand Rapids	500	--	--	500	--	--
Boise Cascade Corp.	International Falls	964	--	964	--	--	--
Certain-Teed Corp.	Shakepee	242	--	--	--	--	242
Champion International Corp.	Sartell	850	--	--	--	--	850
Consolidated Papers, Inc.	Duluth	321	--	--	321	--	--
Georgia-Pacific Corp.	Bemidji	100	--	--	100	--	--
Georgia-Pacific Corp.	Duluth	240	--	--	--	--	240
Hennepin Paper Co.	Little Falls	100	--	--	100	--	--
International Bildrite, Inc.	International Falls	110	--	--	110	--	--
Pottlatch Corp.	Cloquet	520	--	520	--	--	--
Total	10 mills	3,947	--	1,484	1,131	240	1,092
Wisconsin							
Appleton Papers, Inc.	Combined Locks	79	--	--	--	79	--
Consolidated Papers, Inc.	Biron	348	--	--	348	--	--
Consolidated Papers, Inc.	Kimberly	161	--	--	161	--	--
Consolidated Papers, Inc.	Niagara	208	--	--	208	--	--
Consolidated Papers, Inc.	Stevens Point	197	--	--	197	--	--
Consolidated Papers, Inc.	Wisconsin Rapids	1,045	--	1,045	--	--	--
Fraser Papers, Inc.	Park Falls	170	170	--	--	--	--
Georgia-Pacific Corp.	Nekoosa	390	--	390	--	--	--
Georgia-Pacific Corp.	Phillips	75	--	--	75	--	--
Georgia-Pacific Corp.	Port Edwards	230	230	--	--	--	--
Georgia-Pacific Corp.	Superior	232	--	--	232	--	--
Globe Building Materials, Inc.	Cornell	230	--	--	--	--	--
Tenneco Packaging	Tomahawk	1,378	--	--	--	1,378	230
Thilmany Paper	Kaukauna	403	--	403	--	--	--
Wausau-Mosinee Paper Corp.	Brokaw	265	265	--	--	--	--
Wausau-Mosinee Paper Corp.	Mosinee	285	--	285	--	--	--
Weyerhaeuser Paper Co.	Rothschild	143	143	--	--	--	--
Total	17 mills	5,839	808	2,123	1,221	1,457	230
Lake States total	35 mills	15,018	808	6,815	2,602	3,227	1,326

Table 10.--Annual production of active particleboard and panel mills in the Lake States by State, company, location, and product produced, 1998

(In million square feet 3/4-inch basis)

State and company	Location	Product produced	Annual production
Michigan			
Georgia-Pacific Corp.	Gaylord	Particleboard	240
Louisiana-Pacific Corp.	Newberry	Oriented strand board	61
Louisiana-Pacific Corp.	Sagola	Oriented strand board	180
Weyerhaeuser Co.	Grayling	Oriented strand board	200
Total	4 mills		681
Minnesota			
Louisiana-Pacific Corp.	Two Harbors	Oriented strand board	61
Northwood Panelboard Co.	Solway	Oriented strand board	198
Potlatch Corp.	Bemidji	Oriented strand board	480
Potlatch Corp.	Cook	Oriented strand board	241
Potlatch Corp.	Grand Rapids	Oriented strand board	340
Trus Joist MacMillan	Deerwood	Laminated structural lumber	n/a
Total	6 mills		1,320
Wisconsin			
Louisiana-Pacific Corp.	Hayward	Oriented strand board	250
Louisiana-Pacific Corp.	Tomahawk	Oriented strand board	55
Rodman Industries	Marinette	Particleboard	15
Weyerhaeuser Co.	Marshfield	Particleboard	79
Total	4 mills		399
Lake States total		14 mills	2,400

Table 11.--Production and imports of pulpwood, Central States, 1998¹

(In standard cords, unpeeled)

Product form, species group, and destination	Production by State ²				Regional total	Imports		Total receipts
	Illinois	Indiana	Iowa	Missouri		Lake States	Other U.S.	
Roundwood								
Softwoods								
Lake States	582	--	2,930	--	3,513	--	--	--
Northeastern States	--	3,953	--	--	3,953	--	--	--
Southern States	7,179	--	--	4,036	11,214	--	--	--
Total	7,761	3,953	2,930	4,036	18,680	--	--	--
Soft hardwoods ³								
Central States	5,396	9,737	4,634	1,436	21,203	--	--	21,203
Northeastern States	--	117	--	--	117	--	--	--
Southern States	7,712	2,209	--	3,233	13,154	--	--	--
Total	13,108	12,063	4,634	4,670	34,474	--	--	21,203
Hard hardwoods ⁴								
Central States	2,564	19,896	2,018	325	24,802	--	--	24,802
Northeastern States	--	53	--	--	53	--	--	--
Southern States	25,317	14,031	--	61,993	101,341	--	--	--
Total	27,881	33,980	2,018	62,318	126,197	--	--	24,802
Total all roundwood								
Central States	7,960	29,633	6,652	1,761	46,005	--	--	46,005
Lake States	582	--	2,930	--	3,512	--	--	--
Northeastern States	--	4,124	--	--	4,124	--	--	--
Southern States	40,208	16,240	--	69,262	125,710	--	--	--
Total	48,750	49,996	9,582	71,023	179,351	--	--	46,005
Residues								
Softwoods								
Central States	--	--	15,120	--	15,120	--	6,480	21,600
Southern States	--	270	--	22,786	23,056	--	--	--
Total	--	270	15,120	22,786	38,176	--	64,480	21,600
Hardwoods								
Central States	12,442	37,953	7,359	11,219	68,974	1,492	--	70,466
Lake States	--	14,896	1,994	--	16,890	--	--	--
Northeastern States	--	1,503	--	--	1,503	--	--	--
Southern States	18,166	78,045	--	71,169	167,380	--	--	--
Total	30,608	132,397	9,353	82,389	254,747	1,492	--	70,466

Total all residues											
Central States	12,442	37,953	22,479	11,219	84,094	1,492	6,480	7,972	92,066		
Lake States	--	14,896	1,994	--	16,890	--	--	--	--		
Northeastern States	--	1,503	--	--	1,503	--	--	--	--		
Southern States	18,166	78,316	--	93,955	190,437	--	--	--	--		
Total	30,608	132,668	24,473	105,174	292,923	1,492	6,480	7,972	92,066		
Total all wood material											
Central States	20,402	67,586	29,131	12,980	130,100	1,492	6,480	7,972	138,071		
Lake States	582	14,896	4,924	--	20,402	--	--	--	--		
Northeastern States	--	5,626	--	--	5,626	--	--	--	--		
Southern States	58,374	94,555	--	163,217	316,146	--	--	--	--		
Total	79,359	182,664	34,055	176,197	472,274	1,492	64,480	7,972	138,071		

¹ Table may not add due to rounding.

² Vertical columns of figures under the box heading "Production by State" present the amount of roundwood cut or residue generated in each State.

³ Hardwood species with an average specific gravity of 0.50 or less.

⁴ Hardwood species with an average specific gravity greater than 0.50.

Table 12.--Central States pulpwood production by State and destination, 1994-1998

(In thousand standard cords, unpeeled)

Year	Illinois			Indiana			Iowa			Missouri		
	Destination			Destination			Destination			Destination		
	Total	Central States	Other States	Total	Central States	Other States	Total	Central States	Other States	Total	Central States	Other States
1994	76	33	43	147	51	96	22	22	*	88	19	69
1995	81	33	48	310	212	98	23	22	2	113	12	101
1996	95	53	41	149	44	105	23	22	1	126	11	115
1997	70	21	49	175	70	105	35	31	4	133	11	122
1998	79	20	59	183	68	115	34	29	5	176	13	163

* Less than 500 standard cords.

Table 13.--Trends in receipts of roundwood and residue as pulpwood, Central States, 1994-1998

(In thousand standard cords, unpeeled)

Product form and State	1994	1995	1996	1997	1998
Roundwood					
Indiana, Iowa, Missouri	42	54	62	58	46
Residue					
Indiana, Iowa, Missouri	86	243	70	83	92
All wood material	127	297	132	142	138

Table 14.--Average daily production of active woodpulp mills in the Central States
by company, location, and type of pulp produced, 1998

(In tons per 24 hours)

Company	Location	Average daily production	Type of pulp	
			Groundwood/ Mechanical	Semi- chemical
International Paper	Terre Haute, Indiana	561	--	561
Four M Paper Corp.	Fort Madison, Iowa	118	--	118
Jeld-Wen Fiber of Iowa	Dubuque, Iowa	80	80	--
Huebert Fiberboard Co.	Boonville, Missouri	120	120	--
Central States total	4 mills	879	200	679

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Discusses 1998 production and receipts and recent production for other years in the Lake, Central, and Plains States. Shows Michigan, Minnesota, and Wisconsin production by species for each county and compares production by Forest Survey Unit with that of previous years. Presents 1998 production and receipt data for Illinois, Indiana, Iowa, and Missouri by species group and product form. Includes the Plains States 1998 production and receipts by species group and product form.

KEY WORDS: Roundwood, whole-tree chips, residue, pulpwood, particleboard, Michigan, Minnesota, Wisconsin, Illinois, Indiana, Iowa, Missouri, Plains States.



